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FATIGUE PATTERNS OF MOTHERS DURING THE FIRST EIGHT WEEKS POSTPARTUM

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BY

BRENDA L. HANTOS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

THE DEGREE OF MASTER OF NURSING

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Date: April 8 1993

DEDICATION

This thesis is dedicated to my family.

ABSTRACT

Fatigue is a common concern expressed by many mothers following childbirth yet little in-depth research has been done in the area. In this study, the purpose was to describe the pattern of fatigue experienced by first-time mothers during the first eight weeks postpartum. The design of this repeated measures study was descriptive in nature. A non-random convenience sample of 74 first-time mothers with healthy newborns was recruited from a postpartum unit. Each mother completed the Visual Analogue Scale for Fatigue (VAS-F), the Profile of Mood States (POMS), and a Biographical Data Form while in hospital, and during their third and seventh weeks postpartum.

The VAS-F was found to be a reliable and valid instrument to measure maternal fatigue. Internal reliability measures were respectable. Concurrent validity of the VAS-F Fatigue and Energy subscales was established with the corresponding POMS Fatigue and Vigor subscales. Evidence of construct validity of the VAS-F was supported through factor analysis. During the study period, there was a significant decrease in fatigue levels and an increase in energy levels from hospitalization to seven weeks postpartum and from three weeks to seven weeks postpartum. Minimal change was evident in fatigue and energy levels between the hospitalization and three week measures. Biographical factors determined to be significantly associated with maternal fatigue were type of infant feeding at each measurement; and increased infant fussing and crying, as well as, increased sleep disruption during the previous 24 hours at three weeks postpartum. Post-term births were negatively correlated with the fatigue scores during hospitalization. Factors were identified by the mothers which contributed to postpartum fatigue. Measures found to be effective in relieving the fatigue were also reported. The first-time mothers in this study overwhelmingly agreed that fatigue is a maternal concern during the postpartum period.

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CHAPTER 1

INTRODUCTION

Postpartum is a time of profound change for many new mothers. As a result, there are significant demands on the family's coping mechanisms and resources (Nicholson, 1990). From an anthropological perspective, however, Western societies essentially exclude a postpartum period following hospitalization and thus fail to recognize the social support and assistance that is necessary (Stern & Kruckman, 1983). Although childbirth is a normal process, physiological changes, alone, generally take six weeks. Equally important are the psychological and emotional adjustments after childbirth. These are occurring when care-taking needs of the infant are continuous throughout the day and night. With the amount of energy expenditure required, it is not surprising that fatigue is a commonly expressed concern during the postpartum period.

Statement of the Problem

In the promotion of family health, nurses seek to address the problem of fatigue in new mothers. There is overwhelming evidence in the research literature that fatigue exists and is a major concern for both primiparae and multiparae following childbirth (Arizmendi & Affonso, 1987; Brouse, 1988; Chapman, Macey, Keegan, Borum & Bennett, 1985; Cronenwett, 1980; Fawcett & York, 1986; Gjerdingen, Froberg & Wilson, 1986; Gruis, 1977; Harrison & Hicks, 1983; Hiser, 1987; Janzen & Stewart, 1990; Smith, 1989; Tulman & Fawcett, 1988). This has been established at various time periods after birth, mainly through interviews or the use of developed questionnaires where fatigue, or tiredness, is listed as one item. Further to the problem, fatigue has also been implicated as a predisposing factor for some classifications of postpartum depression (Affonso, Lovett, Paul & Shepak, 1990; Dalton, 1989; Errante, 1985; Gjerdingen et al, 1986; Mercer, 1986; Pitt, 1968; Williams, 1967).

While the existence of maternal fatigue as a primary concern is acknowledged in the literature, there is a paucity of research investigating this area in-depth. Little is known about fatigue and, more specifically, the manifestations of it within a postpartum population. The longitudinal parameters of fatigue after childbirth have not been conclusively established. Of the few studies conducted, Mercer (1986) labelled the first month as one of "pervasive fatigue" whereas Gardener (1991), described the first six weeks as a time of "mild" fatigue. Campbell (1986) found the pattern to be changing at four weeks. It is evident that research is needed into the nature and pattern of fatigue after childbirth to enable nurses in hospital and community practice settings to effectively educate and counsel mothers, both prenatally and postnatally, on this multidimensional phenomenon. Clearly, there is a deficit of knowledge in the area and thus a strong need for a descriptive study on maternal fatigue during the postpartum period.

Purpose of the Study

In this study the purpose was to describe the pattern of fatigue experienced by first - time mothers during the first eight weeks postpartum.

Research Questions

1. Is the Visual Analogue Scale for Fatigue (VAS-F) a valid and reliable instrument that may be used for research and practice on a long term basis?
2. What are the levels of fatigue reported by first-time mothers during the postpartum period?
3. What biographical variables are associated with first-time mothers' level of fatigue?
4. What factors do first-time mothers identify as contributing to postpartum fatigue?
5. What measures do mothers report as being effective in relieving the fatigue?

Definition of Terms

First-Time Mother:

Theoretical: a female of childbearing age who has given birth to her first child and is assuming a maternal role.

Operational: a female who has given birth to her first live child.

Postpartum Period:

Theoretical: the time following labour and delivery during which a woman experiences physiological and psychological changes. Physical recovery normally takes six to eight weeks. The psychological transition for primiparas from woman to mother is a unique experience requiring an indeterminate amount of time.

Operational: the first eight weeks following childbirth.

Fatigue:

Theoretical: Fatigue, a multidimensional concept, is a subjective feeling that has physiological and psychological components that may occur simultaneously or separately, where there is a negative feeling of discomfort and a lack of desired energy resulting in decreased efficiency. Fatigue is conceptualized as progressing from tiredness and potentially leading to exhaustion.

Operational: Fatigue was measured by using the Visual Analogue Scale for Fatigue (VAS-F) and the Fatigue Inertia subscale of the Profile of Mood States (POMS).

Assumptions

1. Fatigue is a complex, multidimensional concept, that is distinct, yet overlapping with other phenomena.
2. Mothers may experience varying patterns of fatigue during the postpartum period.
3. The mother's individual characteristics, perceptions and situation may influence the fatigue that she experiences during the postpartum period.

4. Fatigue may be perceived by mothers as a stressful phenomenon during the postpartum period.
5. Subjects will accurately complete the VAS-F, the POMS and the Biographical Data Forms.

Conceptual Framework

The conceptual framework for examining maternal fatigue in the study was based on Rogers' (1990) abstract model of the Science of Unitary Human Beings. Rogers (1983) states that her model is equally applicable to families as well as to individuals. It is within the context of family, and more specifically, mother and newborn, that this study was concentrated. It must be acknowledged, however, that the mother and infant do not exist in isolation but rather are in coexistence with their environment.

The life process of humans in interaction with the environment is the focus of Rogers' model. Rogers (1970) identifies five underlying assumptions in her model. These encompass humans as being more than, and different from, the sum of the parts but rather a unified whole. Humans are an open system in continuous interaction with the environment, constantly evolving, patterned and organized, and capable of "abstraction and imagery, language and thought, sensation and emotion" (Rogers, 1970, p. 73).

Central to Rogers' (1990) model are the concepts of energy fields, a universe of open systems, pattern and multidimensionality. Briefly, energy fields are the fundamental unit of humans and the environment. People do not <u>have</u> energy fields but rather they <u>are</u> energy fields. These energy fields exist within an open system. Pattern, an abstraction, is defined as "the distinguishing characteristic of an energy pattern perceived as a single wave" (Rogers, 1990, p. 7). The human and environmental energy fields, each of which are unique and in mutual process, are characterized by their continuously changing patterns (Rogers, 1988). Multidimensionality is a way of perceiving reality that is a "nonlinear domain without spatial or temporal attributes" (Rogers, 1990, p. 7).

Three principles further explain the life process and the nature of its evolving. These Principles of Homeodynamics are:

Principle of Resonancy: Continuous change from lower to higher frequency wave patterns in human and environmental fields.

Principle of Helicy: Continuous innovative, unpredictable, increasing diversity of human and environmental field patterns.

Principle of Integrality: Continuous mutual human field and environmental field process (Rogers, 1990, p. 8).

These assumptions, concepts and principles are the basis for Rogers' model which provided the conceptual framework for the research. The focus of the study, then, was on the first-time mothers' changing energy field patterns in relation to fatigue. This was occurring as the mothers were adjusting to a new life event - the birth of a child.

CHAPTER 2

LITERATURE REVIEW

In this review, an overview of the sleep patterns during the perinatal cycle will be given to provide a contextual basis for the primary focus of fatigue in the postpartum period. Current research on postpartum fatigue will be examined and summarized. The relationship between postpartum depression and fatigue will then be addressed. Health promotion strategies for postpartum fatigue will be delineated and instrumentation to measure fatigue in the postpartum period will be discussed. Finally, a summary of related literature will be given.

Sleep Patterns and the Perinatal Cycle

Sleep patterns of primiparas and multiparas during pregnancy and postpartum have been documented through physiological (EEG, EOG, and EMG) recordings (Karacan, Hein, Agnew, Williams & Ross, 1968; Karacan, Williams, Hursch, McCaulley & Heine, 1969). Profound changes were discovered. There was a 1) significant suppression of Stage 4 or deep restorative sleep during late pregnancy; 2) a sudden recovery of Stage 4 sleep beginning on the first postpartum night which is hypothesized to be associated with the physical exertion during the labour and delivery; and, 3) a reduction of Rapid Eye Movement (REM) or the dreaming phase of sleep immediately following delivery. By the second postpartum week, the sleep patterns tended to normalize. In another study (Karacan et al, 1969), subjects who had their first menses after childbirth, showed an even greater increase in Stage 4 sleep in later postpartum than during immediate postpartum. The researchers concluded that although the total sleep time was reduced in later postpartum, the increase in Stage 4 sleep indicated than the mothers were sleeping more efficiently. These changes in the sleep cycles were documented in a laboratory setting without sleep disruptions occurring as a result of normal infant care. It could be

hypothesized that empirical evidence may show even more striking changes in sleep patterns of postpartum women.

Three studies were located that examined sleep patterns during hospitalization after the birth. First, in one study, there was no significant relationship between intrapartal sleep loss and anxiety, hostility and depression on the first postpartum day (Mead-Bennett, 1990). Investigation did not include longitudinal parameters. Second, Keefe (1988) compared the self-reported sleep patterns of mothers in two types of rooming-in practices: continuous rooming-in and day-time rooming-in whereby the infants were returned to the nursery for the night. Both groups of mothers were not satisfied with the amount or quality of sleep obtained during their postpartum hospitalization. Third, Lentz and Gruis Killien (1991) specifically examined sleep patterns during the first 48 hours postpartum in both primiparas and multiparas. While the majority of mothers reported their sleep to be good to excellent, trained observers noted a significant number of awake periods during the night. It was postulated that the discrepancy between the mother's perceptions and the observer's reports may be related to the women becoming accustomed to disrupted sleep patterns in the latter part of pregnancy. Although small sample sizes have precluded generalizability of results, it has been suggested that significant sleep deprivation occurs for many mothers in the hospital environment and thus there is little opportunity for restorative sleep after childbirth (Keefe, 1988; Lentz & Gruis Killien, 1991). This is antithetical to the classic work of Rubin (1984) recommending that after the birth mothers have a need for "taking in" to accomplish the maternal tasks.

Postpartum Fatigue

In the descriptive literature, profound fatigue is identified by some as the single most immobilizing factor in the postpartum period. Sleep deprivation prolongs the fatigue and impedes the effectiveness of physiological recovery as well as psychological adaptation (Rubin, 1984). It is suggested that fatigue can become a critical factor influencing the

developing maternal-infant relationship (Chapman et al, 1985; Mercer, 1985). Rubin (1984) proposes that the sleep deprivation and disruption linked to fatigue "begin in the last month of pregnancy and increase exponentially in labor so that by delivery there is acute sleep hunger" (p. 114). Poole (1986) argues that fatigue is an accepted symptom, related to physiological and psychological causes, beginning as early as the first trimester of pregnancy but it is essentially ignored by both the nursing and medical professions. The sleep disruption during the third trimester from physiological causes (Schweiger, 1972) is, however, commonly acknowledged. Karacan et al (1968) claim that statements about the sleep disturbances during pregnancy, "unsupported by specific studies, all too frequently are passed from one textbook to another and become a part of medical folklore" (p. 580) thus the need for research is paramount. Similarly, although the fatigue after childbirth is addressed in the descriptive literature, there is little in-depth investigation of the postpartum fatigue phenomenon as a primary focus.

Research data have consistently demonstrated that the concept of fatigue exists and is a major concern for both primiparae and multiparae during the postpartum period (Arizmendi & Affonso, 1987; Brouse, 1988; Chapman et al, 1985; Cronenwett 1980; Fawcett & York, 1986; Gjerdingen et al, 1986; Gruis, 1977; Harrison & Hicks, 1983; Hiser, 1987; Janzen & Stewart, 1990; Smith, 1989; Tulman & Fawcett, 1988). There is, however, a paucity of documentation of a conceptual definition of fatigue in the research when the phenomenon reportedly occurs. Fatigue, tiredness and exhaustion are terms that are often used synonymously although significant conceptual differences are proposed. A differentiating factor is that tiredness is often perceived as positive, particularly if it ensues from a satisfying activity (Rhoten, 1982). Rest, sleep and nourishment can resolve tiredness (Hart & Freel, 1982). Conversely, fatigue is perceived as a negative, uncomfortable experience often resulting from overtiredness. It is of longer duration than tiredness, however, energy repletion is possible if restorative measures are taken. Alternately, energy stores are completely depleted with exhaustion (Rhoten, 1982).

Fatigue, or a related term such as tiredness or exhaustion, has been identified as a postpartum concern during various time periods after birth. This has been established mainly through interviews or the use of developed questionnaires where fatigue is listed as one item. Included are studies where data has been collected during hospitalization (Gardner, 1991; M. E. Zaffke, personal communication, June 25, 1991), two weeks (Campbell, 1986; Gardner, 1991; Hiser, 1987), three weeks (Brouse, 1988; Campbell, 1986), four weeks (Campbell, 1986; Gruis, 1977; Harrison & Hicks, 1983; Mercer, 1986; Smith, 1989), six weeks (Arizmendi & Affonso, 1987; Fawcett & York, 1986; Gardner, 1991), three months (Janzen & Stewart, 1990), four months (Chapman et al, 1985; Mercer, 1986), eight months and one year (Mercer, 1986) after childbirth.

One study was located that examined fatigue during postpartum hospitalization. Zaffke (personal communication June 25, 1991) investigated postpartum fatigue and sleep in a comparative study between 24 hour continuous rooming-in and daytime only modified rooming-in practices. Eighteen healthy postpartum mothers who had uncomplicated vaginal deliveries were in the sample. Polysomnolography was performed on the women during their first night after delivery, however, results are unavailable. The subjects also completed the Visual Analogue Scale for Fatigue (VAS-F) (Lee, Hicks & Nino-Murcia, 1991) in the evening prior to sleep onset and in the morning upon awakening. There were no statistically significant differences between the fatigue and energy scores reported in the Modified Rooming-In group and the 24 Hour Continuous Rooming-In group. Only the Modified Rooming-In group reported a statistically significant improvement in fatigue and energy ratings from evening to morning. It must be recognized that the small sample size prevents the generalizability of the results.

Few longitudinal studies investigating fatigue as a postpartum concern have been documented. Campbell (1986) conducted an exploratory descriptive study focusing on postpartum sleep patterns of healthy primipara women and their infants at two, three and four weeks postpartum. The findings indicated that "most of the mothers obtained as many

hours of sleep in the postpartum period as they did prior to pregnancy. However, this sleep was subject to many interruptions" (Campbell, 1986, p. 193). The interruptions caused greater concern for the mothers than the sleep loss. Interestingly, two types of "tiredness" were described by the mothers: physical and emotional. Generally, resolution of physical tiredness was possible after several hours of uninterrupted sleep. Conversely, emotional tiredness persisted and was related to the continuous care-taking responsibilities of the infant. One could postulate that the mothers in Campbell's study were actually referring to the multidimensional concept of fatigue. Overall, the findings from Campbell's unique study are significant for nursing practice of the postpartum family. Generalizability of the results are limited at this stage, however, by the small convenience sample.

Gardner (1991) surveyed fatigue levels of a sample of 35 primiparas and multiparas at two days, two weeks and six weeks postpartum. The following instruments were utilized: the Maternal Adjustment and Maternal Attitude Questionnaire; the Beck Depression Inventory; and the Rhoten Fatigue Scale, a unidimensional semantic differential scale subjectively rated from zero ("Not Tired") to 10 ("Total Exhaustion") (Rhoten, 1982). The researcher acknowledged that reliability and validity of the Rhoten Fatigue Scale has not been previously reported. In Gardner's study, test-retest reliability was low which would be representative of change in fatigue scores over time. From the findings using the Rhoten Fatigue Scale, the mothers were categorized as mildly fatigued during each measurement period. Alternately, when the fatigue items on the Beck Depression Inventory were analyzed separately, a curvilinear relationship was shown with a peak of fatigue at two weeks that was significantly different from the levels at two days and six weeks. The results from the Beck Depression Inventory minus the fatigue items were not significant. Generally, demographic variables that were found to be significantly correlated with high fatigue levels were child care problems, whereas lower fatigue levels were related to increasing age, education and availability of household help. Further research is needed to establish if these findings are representative for postpartum mothers.

Mercer (1986) conducted an extensive longitudinal comparative study on the experiences of first-time mothers in three age groups: 15-29 year, 20-29 years, and 30-42 years. Five periods of measurements were taken: early postpartum during hospitalization, one, four, eight and 12 months after birth. The first-time mother's perspective was accomplished through "semi-structured interviews that had both forced-choice, Likert-type scale responses and open-ended questions" (Mercer, 1985, p. 200). After analysis, the first month was labelled one of "pervasive fatigue and frustration" for mothers of all age groups (Mercer, 1986, p. 119). Although the concern with fatigue was greater as the age of the mother increased, the teenagers reported more difficulty with sleep deprivation. Lack of restful sleep in the month prior to birth, recuperation from the birth process, and postpartum adjustment all contributed to the fatigue, which in turn influenced the mother's perceived ability to cope. Gratification with the maternal role was also lowest during the first month.

It is of particular interest in Mercer's (1986) study that at four months, there was a turning point for all age groups with more comfort and satisfaction expressed with the maternal role. Concern with sleep deprivation and fatigue decreased significantly at this time for many mothers. A critical factor was over half of the infants were sleeping through the night at four months. This concurs with Rubin's (1984) claim that fatigue continues for many mothers during postpartum while the infant is waking for feedings throughout the night. Sleep disruption every two to three hours does not allow for the completion of a sleep cycle. Interestingly, fatigue was reported during the entire first three month (Janzen & Stewart, 1990) and four month (Chapman et al, 1985) periods in other studies. One could question if this is related to the emotional fatigue addressed by Campbell (1986). Gjerdingen et al (1986) conclude that "although fatigue is often considered a normal component of the postpartum period, it is not trivial since it may contribute to depression and lowered quality of life for women who struggle with it for weeks or months" (p. 138).

Postpartum Fatigue and Depression

Postpartum depression is a complex phenomenon. Definitions have encompassed depression, in general, as a mood, a symptom, a syndrome, and a disease (Gobel & Donovan, 1987). Disagreement also exists in the postpartum depression literature. Nicholson (1990) has identified four issues related to postpartum depression. These are 1) the lack of a specific definition due to confusion between the blues, depressed moods and clinical depression, 2) the duration, 3) the incidence and 4) whether postpartum depression is specifically associated with childbirth. One recognized expert who has studied extensively in the area, Cox (1986), differentiates postpartum depression from postnatal blues by the longer duration (four to six weeks if treated; up to one year if untreated), incidence (a conservative estimate of 10-15 percent), onset (after the second postpartum week) and the increased severity. Alternately, postnatal blues are a self-limiting, transitory depression characterized by weepiness and irritability that are common to 50-70 percent of women during the first two postpartum weeks. Postpartum psychosis, a severe depressive state with symptomology that may include delusions and hallucinations lasting six to 12 weeks, occurs in 0.2 percent of women.

The etiology of postpartum depression remains uncertain (Cox, 1986; Gjerdingen et al, 1986; Hopkins, Marcus & Campbell, 1984) although fatigue has been implicated as a contributing factor (Affonso & Domino, 1984; Affonso et al, 1990; Dalton, 1989; Errante, 1985; Gjerdingen et al, 1986; Mercer, 1986; Pitt, 1968; Williams, 1967). Lack of sleep and the related fatigue from sleep disturbances are commonly associated with depression and anxiety (Spiegel cited in Potempa, Lopez, Reid & Lawson, 1986), though in postpartum depression there is typically a very strong desire for sleep (Ball, 1987). No research has shown a direct link between sleep deprivation and postpartum depression (Errante, 1985).

It has not yet been determined whether depression during childbearing is a unique and distinct syndrome. Some depressive symptoms are reflective of normal changes and

stressors during the postpartum period (Affonso, 1987; Affonso et al, 1990; Hopkins et al, 1984; O'Hara, Neunaber & Zekoski, 1984). Anxiety, apathy, irritability and aggression observed in some mothers can potentially be misdiagnosed as a postpartum depression. These symptoms are also correlated with sleep deprivation and thus may be relieved by restorative sleep (Errante, 1985). Affonso (1987) states that "nursing research can make a valuable contribution by developing more sensitive instruments, rather than relying on "borrowed" tools from other disciplines that are not as familiar with the postpartum phenomenon" (p. 19). There is a strong need for nursing studies to evaluate sleep loss in the postpartum and its effect on mother's moods (Mead-Bennett, 1990).

Health Promotion Strategies For Postpartum Fatigue

It is proposed that anticipatory guidance for the promotion of health practices to cope with postpartum fatigue must begin early in the perinatal cycle. During the first trimester of pregnancy, Poole (1986) recommends that nursing interventions for women experiencing fatigue should consist of three components: "1) sharing information about the nature of the fatigue, 2) developing an activity-rest program [including afternoon naps and periods of relaxation], and 3) sharing information aimed at alleviation of psychological stresses" (p. 377). Moreover, parents also need to be informed about the concern of postpartum fatigue during this prenatal period so that appropriate strategies can be planned to promote rest and physical restoration during the postpartum period (Smith, 1989). It is questioned whether the same relaxation techniques taught for labor and delivery would be useful in dealing with the sleep deprivation and tensions that concur with the postpartum period (McBride, 1984). Nurses are also in an ideal role to teach mothers and fathers how a newborn's sleep cycle differs from that of an adult and how the circadian rhythm phenomenon can affect all of the family members (Deters, 1980).

On a more general level, numerous strategies have been suggested to relieve or prevent the phenomenon of fatigue. In addition to identifying energy-depleting factors in

daily living to ensure that energy is utilized effectively (Piper, 1989), the promotion of adequate rest, nutrition, exercise and psychological well-being are advised (Kellum, 1985) for energy conservation and restoration . Principles of "sleep hygiene" have been been outlined by Anch, Mitler & Walsh (1988). These include:

1. Keeping a regular sleep-wake schedule;
2. Avoiding the use of caffeine (particularly in the late afternoon and evening), nicotine, and alcohol;
3. Exercising regularly in the afternoon or early evening;
4. Establishing a bedtime routine; and,
5. Maintaining an amenable environment for sleeping such as a slightly cool room temperature, a comfortable mattress and most importantly, utilizing the bedroom for sleeping (p. 194).

A number of these factors, including establishing a regular schedule for sleeping, waking and exercise, as well as a bedtime routine, are not realistic for most postpartum women.

Naps are a common theme in recommendations to mothers of newborns. Napping is not, however, equivalent to "single, unbroken sleep" (Anch et al, 1988, p. 83). The restorative effects of napping are dependent upon the length of the nap, amount of sleep loss prior to the nap and the stage of the circadian cycle in which the nap is taken (Anch et al, 1988; Minors & Waterhouse, 1987). Results from Johnson's study (cited in Anch et al, 1988) indicate that napping between 1200 and 1400 hours rather than in the early morning is most effective for overcoming sleep loss. Further, sleep inertia lasts longer after a morning nap than an afternoon nap (Naitoh cited in Anch et al, 1988). This may be related to REM sleep predominating during morning naps and Stage 4 sleep during late afternoon or evening naps (Hayter, 1980, p. 461). Anch et al (1988) report that "although circadian cycles clearly play a role in the recuperative power of sleep in general and naps in particular, further studies are needed to firmly establish the importance of napping in sleep-wakefulness behavior" (p. 84).

Massage has been suggested as a method of relieving fatigue, although this is not commonly practiced within Western societies. In the book Healing Massage Techniques (Tappan, 1988), reference is made to the therapeutic effects of massage for fatigue. An example is given whereby a 37 year old woman complains of fatigue and irritability because "she feels that she has been caring for everyone's needs but her own". It may be postulated that some postpartum mothers may have comparable sentiments. Swedish, Polarity and Shiatsu methods of massage are recommended to promote a deepened state of relaxation to relieve the fatigue. Environmental elements such as lighting, ventilation, and heat, use of music and voice tone are proposed as additional considerations. Instruction has also been provided on a combination of acupressure and massage techniques to relieve fatigue (Avakyan, 1990).

In a review of the literature, no studies could be located to validate the therapeutic effects of the various recommendations to relieve postpartum fatigue, although napping, in general, has been examined. Shaver and Giblin (1989) state, when addressing problems with the cycle of sleep, that "although it might be considered premature to suggest therapeutic interventions before adequate descriptive work is available, it can be argued that mechanisms are sometimes illuminated when therapeutic strategies are being tested" (pp. 89-90). Nursing studies related to sleep are limited in the literature (Robinson, 1986; Shaver & Giblin, 1989). No studies could be found that evaluated nursing interventions for the resultant fatigue from sleep deprivation and disruption. Research is needed to determine effective health promotion strategies for encouraging rest and adaptive emotional adjustments in the postpartum period (Errante, 1985).

Fatigue Measurement Scales

Few fatigue measurement tools within nursing or across disciplines could be located in an extensive review of the literature. Objective checklists that were reviewed included an Observation Checklist (Rhoten, 1982) and the Fatigue Rating Scale (Kashiwagi, 1971).

Subjective rating scales found were the Fatigue Symptom Checklist (Yoshitake, 1971), the Fatigue Severity Scale (Krupp, LaRocca, Muir-Nash & Steinberg, 1989), the Piper Fatigue Self-Report Scale (Piper, Lindsey, Dodd, Ferketich, Paul & Weller, 1989), the Rhoten Fatigue Scale (Rhoten, 1982) and the Visual Analogue Scale for Fatigue (Lee et al, 1991). Indeed, the subjective experience of fatigue supports the use of self-report measures.

Numerous methodological problems exist when attempting to measure the concept of fatigue (Kashiwagi, 1971). Operational definitions are seldom provided in the literature. Since a scientific definition of fatigue has not been established (McFarland, 1971; Valdini, 1985), there is lack of clarity in many studies on the attributes of the concept being measured. In addition, confounding variables from symptoms concurrent with fatigue pose a methodological problem when measurement tools are being developed. Further research is also needed to determine if fatigue in healthy and ill populations is equivalent. Similarly, it is unknown if tools developed and tested on populations such as industrial workers or in different cultures would be valid and reliable for use with North American postpartum women. Moreover, data on reliability and validity of the tools was not reported in the literature for many of the tools reviewed. Nail and King (1987) state that "the multiple-item instruments tend to be more fully developed with established reliability and validity, while the single question format usually lacks information on reliability and validity. The yes/no format fails to acknowledge the importance of establishing the level of severity of fatigue and detecting changes in that level over time" (p. 259). Zinchenko, Leonova and Strelkov (1985) explain that "all existing methods of evaluating fatigue suffer to a greater or lesser degree from serious shortcomings. The only way in which the problem of diagnosis of fatigue can be solved is through the application of combined tests" (p. 5).

Summary of Related Literature

From an extensive review of the literature, it can be concluded that:

- the function of sleep remains unknown although several theoretical models have been proposed (Anch et al, 1988; Dotto, 1990; Shapiro & Flanigan, 1993; Webb, 1988).
- sleep deprivation and disruption lead to fatigue (Anch et al, 1988; Bonnet, 1985; Johnson, 1982).
- an examination of sleep patterns during the perinatal cycle has demonstrated significant disruptions in maternal sleep (Karacan et al, 1968; Karacan et al, 1969; Keefe, 1988; Lentz & Gruis Killien, 1991; Mead-Bennett, 1990). Further study in the area is needed.
- the existence of fatigue is well-established in the postpartum literature but there is a paucity of in-depth research investigating the phenomenon during the postpartum period, particularly on a longitudinal level.
- fatigue has been implicated as a contributing factor in postpartum depression (Affonso et al, 1990; Dalton, 1989; Errante, 1985; Gjerdingen et al, 1986; Mercer, 1986; Pitt, 1968; Williams, 1967), but fatigue and depression remain two distinct, yet overlapping concepts.
- health promotion strategies have historically been recommended to mothers to cope with fatigue but, generally, no validating research could be found.
- few valid and reliable instruments have been developed to measure fatigue (Aistars, 1987; Nail & King, 1987; Piper, 1986, 1989; Potempa et al, 1986; Varricchio, 1985). With many of the existing tools, numerous methodological problems exist. No tool was located that was specifically designed for use with postpartum mothers. However, the reliability and validity has been established for the Visual Analogue Scale for Fatigue (VAS-F) (Lee et al, 1991) in postpartum and nonpostpartum samples.

In conclusion, little nursing research has been conducted on fatigue. More specifically, there has been very limited documentation of in-depth investigation into maternal fatigue during the postpartum period. Few reports were located that examined this common concern of new families. Clearly, more extensive research is needed into the phenomenon of postpartum fatigue.

CHAPTER 3

METHODS

Design of the Study

The design of this repeated measures study was descriptive in nature.

Subjects

In 1991, there were approximately 42,900 births in Alberta. Of those, some 16,800 were the mothers' first-born child (Alberta Health, 1991). The majority of these mothers would have received nursing service while in hospital and then from community health agencies. For this study, the subjects were in a hospital and then a home setting.

A non-random convenience sample of first-time mothers was utilized for this study. The researcher sought permission from the nursing and medical divisions of a postpartum unit within a large city teaching hospital to access potential subjects. Once ethical approval was received, the researcher contacted the postpartum unit supervisor to make arrangements to meet with the nursing staff to discuss and answer questions about the study. The nursing manager of the unit, or other designated nurses, were requested to distribute an information letter (Appendix B) to potential subjects who met the selection criteria. Daily visits, exclusive of weekends, were made to the postpartum unit to determine if there were interested potential subjects who fulfilled the study criteria. If so, the researcher met with them and gave a brief explanation about the study including the time commitment required of the subjects. Ample opportunity was allowed for questions. The first-time mothers were informed that participation was voluntary, there would be no changes to their nursing or medical care if they refused and that they could withdraw from the study at any time. Interested volunteers were asked to sign an informed consent to participate in the study (Appendix C) with a second copy given to them.

Exclusion Criteria

The following exclusion criteria for potential subjects were employed for the study:

1. multiparas
2. subjects who did not read or understand English
3. women under 18 years of age
4. women who were hospitalized during the last month of pregnancy
5. mothers who delivered by cesarean section
6. mothers of newborns who were admitted to the Neonatal Intensive Care Unit
7. women who delivered a stillborn or experienced a neonatal death

Sample Size

Seventy four first-time mothers were recruited to investigate postpartum fatigue, taking into account the fact that attrition is a factor in studies of repeated measures. Those subjects who withdrew from the study were replaced until the appropriate sample size was obtained. Data were collected on the postpartum unit for approximately three months.

Instruments

Data were collected using two instruments. These were the Visual Analogue Scale for Fatigue (VAS-F) and the Profile of Mood States (POMS). Biographical data were also collected to describe the sample and to obtain additional information about the mothers' perception of fatigue.

Visual Analogue Scale for Fatigue (VAS-F)

The VAS-F is an 18-item visual analogue scale developed to quantitatively evaluate the severity of fatigue (Lee et al, 1991) (Appendix A). This scale was chosen for several reasons. First, it is a multidimensional measurement scale thus having the potential to reflect the complexity of postpartum fatigue. Second, reliability and validity of the tool with normal healthy adults have been established. It has also been used with a small sample of postpartum women during hospitalization (M. E. Zaffke, personal

communication June 25, 1991). Third, concurrent validity has been determined with the Profile of Mood States (POMS) Fatigue and Vigor subscales and the Standford Sleepiness Scale. Fourth, it has simple instructions and can reportedly be completed within two minutes. Fifth, it can be used repeatedly since it refers to a rating of current symptoms.

The VAS-F is composed of 13 fatigue-related items and 5 energy-related items. Descriptors for the bipolar anchors were chosen from a literature review and from content analysis of interviews with patients presenting with complaints of fatigue. An "X" is marked on each of the 100 mm horizontal lines to indicate the subject's response to the items of how she/he is "feeling right now" (Lee et al, 1991, p. 294). Detailed instructions for measuring and scoring the VAS-F were obtained (Lee, personal communication, July 9, 1991). The fatigue and energy scores are computed by summing the scores for each of the respective items and then calculating the means. Higher numerical values are indicative of greater levels of fatigue or of energy, with 100 being a maximum score.

Reliability and validity of the VAS-F to measure fatigue and energy levels have been reported (Lee et al, 1991). The VAS-F was tested, both before and after one night's sleep, on 75 healthy male and females aged 18-55 years and 57 male and female patients being medically evaluated for sleep disorders with a major complaint of fatigue. The Cronbach's alpha coefficient, the reliability measure used to establish internal consistency for the 13-item Fatigue subscale, was 0.91 and 0.96 (evening data) and 0.96 and 0.95 (morning data) for the healthy group and patient sample respectively. The Cronbach's alpha for the five item Energy subscale for the healthy group and the patient group was 0.94 and 0.96 (evening) and 0.95 and 0.94 (morning). The Fatigue and Energy subscale evening scores were correlated at -0.54 for the healthy subjects and -0.73 for the patient subjects.

Concurrent validity was determined for the VAS-F Fatigue and Energy subscales through adding two additional instruments in random order to the VAS-F, the Standford Sleepiness Scale (SSS) (degree of sleepiness is rated on one scale from 1 = not sleepy to

7 = very sleepy) and the Profile of Mood States (POMS) (65 items rated from 0 = not at all to 4 = extremely, with subscales on Fatigue-Inertia, Vigor-Activity, Confusion-Bewilderment, Anger-Hostility, Depression-Dejection and Tension-Anxiety). Psychometric properties have been demonstrated for these two instruments. The Pearson correlations were significant between the VAS-F Fatigue subscale and both the morning and evening scores from the SSS and the Fatigue-Inertia subscale of the POMS. Alternately, the VAS-F Fatigue subscale was negatively correlated with the Vigor-Activity subscale of the POMS. The VAS-F Energy subscale was negatively correlated with the SSS and POMS Fatigue-Inertia subscale and positively correlated with the Vigor-Activity subscale.

The VAS-F was statistically tested to determine if fatigue and energy could be distinguished from other affective states on the POMS. The VAS-F Fatigue and Energy subscales were not significantly correlated with Depression, Tension or Anger from the POMS in healthy subjects. There was a significant relationship between the VAS-F Fatigue morning scores and the POMS subscale of Confusion-Bewilderment.

The sensitivity of the VAS-F in detecting within-subject variations in fatigue and energy before and after sleep, was established through paired t-test evaluation of the differences between the mean scores. Healthy subjects showed a significant difference on all measures between their morning and evening scores while patients with sleep disorders had no significant differences.

The VAS-F has also been used with a sample of 18 postpartum women in hospital (M. E. Zaffke, personal communication June 25, 1991). The subjects completed the VAS-F in the evening prior to sleep onset and in the morning upon awakening. Data analysis demonstrated a high degree of internal reliability for the VAS-F. The Cronbach's alpha for the Fatigue subscale was 0.97 (evening) and 0.96 (morning). For the Energy subscale, the Cronbach's alpha was 0.90 (evening and morning data). The mothers reported that the tool was easy to understand and took minimal time to complete.

Profile of Mood States (POMS)

The POMS was selected for the following reasons: First, fatigue is one of the concepts measured in the six subscales. Statistical analysis in this study will give additional data on whether fatigue is a distinct, yet overlapping symptom, of other concepts such as those measured by the POMS within a postpartum sample. Second, the POMS has established reliability and validity. Third, it is appropriate for multiple assessments with the same individual. Fourth, it is easy to administer and can reportedly be completed within three to five minutes (McNair, Lorr & Droppleman, 1981).

The POMS measures six mood or affective states: Fatigue-Inertia, Depression-Dejection, Tension-Anxiety, Anger-Hostility, Vigor-Activity, and Confusion-Bewilderment. The self-report consists of 65 statements, each of which is responded to on a five-point scale: 0 = not at all; 1 = a little; 2 = moderately; 3 = quite a bit; 4 = extremely. Subjects are instructed to choose the answer that best describes "how you have been feeling during the past week including today" although rating periods of "today" and "right now" have been utilized (McNair et al, 1981, p. 5). For this study, the "right now" instructions were used for consistency with the VAS-F. To obtain a score for each of the six mood states, the sum of the responses are totaled for each mood subscale. Two of the items receive negative weights. These are "Relaxed" in the Tension-Anxiety subscale and "Efficient" in the Confusion-Bewilderment subscale. Raw scores on each mood scale are transformed to the standardized t-scores for the appropriate normative sample with the use of profile sheets provided for college populations. A Total Mood Disturbance Score may also be calculated by summing the score totals for each of the six mood states, however, norms or validity data are not provided in the manual and were not used for this study.

Reliability and validity of the POMS have been reported from psychiatric outpatient samples (McNair et al, 1981). Internal consistency reliabilities (Kuder-Richardson 20) of the Fatigue-Inertia subscale were listed in two studies of male and female psychiatric outpatients as 0.94 and 0.93, with a range of 0.84 to 0.95 for the other subscales (McNair

et al, 1981). As would be expected when measuring mood state, the test-retest stability of POMS is only fair with reliability coefficients reported in various studies ranging from 0.61 to 0.74. Research has also been used to demonstrate factorial validity of the six mood dimensions. Evidence of construct and concurrent validity of the POMS has been supported in numerous studies (McNair et al, 1981). Overall, the POMS is a useful instrument for providing information on present mood state and has been utilized within a variety of settings and populations (Peterson & Headen, 1984).

Procedure

The convenience sample of first-time mothers was obtained from the postpartum unit, as has been described. A master list with the first-time mother's name, address, phone number and infant's birthdate was compiled as the subjects were recruited. A code number was assigned to each participant and used on each of the tools to ensure subject anonymity. As the packages were returned to the researcher, they were checked off against the master list.

Data were collected at three intervals for each first-time mother: during hospitalization, and the third (3 - 4) and seventh (7 - 8) weeks postpartum. Three separate packages were given containing a covering letter with instructions, the V^S-F and POMS scales,[1] the designated Biographical Data Form I, II, or III (Appendices E and F), and a stamped self-addressed return envelope to the Faculty of Nursing at the University of Alberta (for the second and third packages). To control for fatigue, the sequence of the tools was randomly ordered within each package of materials.

The data collection procedure was as follows:

1. The first package was given to the mothers who fit the study criteria, who volunteered and gave written consent (Appendix C) to participate after speaking with

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[1]Footnote. Due to copyright, copies of the instruments are not included in this thesis. The addresses for obtaining information on the instruments can be found in Appendix A.

the researcher about the study. The mothers were instructed to give the completed packages to their nurse or to hand it in at the nursing station. The packages were then placed in a specially marked file on the postpartum unit by the nurses. The researcher picked up the packages on a regular basis.

2. The second package was mailed to the first-time mothers for completion at a time during their third postpartum week. The time of mailing to the mother was based upon the infant's birthdate. The package was estimated to arrive at the beginning of the third week after childbirth.
3. The third package was mailed for completion when the first-time mother was in her seventh week postpartum, according to the newborn's birthdate as described above.
4. A follow-up phone call was made to those mothers whose packages had not been received within approximately two weeks of expected completion to determine if they had received the package or were still interested in participating in the study.

Ethical Considerations

Ethical approval was sought from the Ethics Review Committee (Faculty of Nursing) and then Research Committee of the cooperating institution. Permission was obtained to use the VAS-F and M. D. Angus & Associates Ltd. were contacted for clearance to utilize the POMS.

The rights of the subjects were protected in the following ways. A written explanation of the study and the participant's role was distributed to potential subjects by nurses on the postpartum unit (Appendix B). Those first-time mothers expressing interest in the study were then contacted by the researcher. Ample opportunity was given for questions to be addressed. The potential subjects were informed that participation in the study was completely voluntary, they could withdraw from the study at any time without penalty and there were no consequences for refusing to participate. The subjects had the right to refuse to answer any questions. There were no direct benefits to the individual

subject. No risks were anticipated. When any subject's scores deviated significantly from the norms, the researcher contacted that mother to determine if she required additional assistance with the care of herself or the baby. Although appropriate referrals could have been offered, for example, to the district public health nurse or a clinical psychologist, this was not necessary. Each subject who agreed to be in the study signed a consent form (Appendix C) and was given a second copy.

Subject confidentiality and anonymity was ensured. Only the researcher and the thesis committee had access to the data. A subject code number was assigned and used on the tools. The list of the subjects' names, addresses, phone numbers and infants' birthdates with the accompanying subject code numbers, was destroyed upon completion of the study. Results are stored in a locked file. The subjects were informed that the data will not be destroyed as it may be utilized in the future for secondary analysis, however, ethical clearance would be required at that time. A short summary of the findings was made available to the subjects and to the postpartum unit that participated in the study.

Further research on postpartum fatigue is being conducted by a University of Alberta Faculty of Nursing Professor and this had received ethical clearance from the Ethics Review Committee prior to completion of the present study. An additional consent form (Appendix D) was included in the third package. Mothers were asked to sign the consent form and return it only if they were interested in receiving information from another researcher at approximately two months postpartum regarding a study of maternal fatigue during the first year after childbirth. They were under no obligation to participate in the study if they consented to receive the information.

Data Analysis

The biographical data were coded, the responses on the VAS-F scales were measured and scored, and the responses on the POMS subscales were computed by the researcher who was blind to the identity of the respondents. The data were then re-

examined to ensure accuracy of the coding, scoring and recording. The SPSSx statistical package was utilized for computer analysis (SPSS, 1988). Descriptive statistics were used to summarize the data from the VAS-F and the POMS including frequencies, means and standard deviations. The reliability of the VAS-F over time was analyzed by using Cronbach's alpha coefficients as a measure of internal consistency. Concurrent validity was evaluated by correlating the VAS-F scores with those from the corresponding subscales of the POMS. Construct validity was examined utilizing factor analysis with Varimax rotation. Repeated Measures ANOVA was computed to determine if there were significant differences in the fatigue and energy scores across the three measurements. The relationship between biographical data and level of fatigue was examined using Pearson Correlation and Oneway ANOVA procedures. Finally, the content of the open-ended questions from the biographical data was summarized and analyzed. Common themes were identified.

CHAPTER 4
FINDINGS

In this chapter, a description of the sample will be given along with a summary of the mothers' responses from the Biographical Data Forms. The major findings of the study will then be presented by addressing each of the research questions. In reporting the findings, the VAS-F Fatigue and Energy subscales will be referred to as "VASF" and "VASE", respectively. Accordingly, the POMS Fatigue and Vigor subscales will be labelled as "Fatigue" and "Vigor". The corresponding measurement time will be designated with an "1", "2", or "3".

Description of the Sample

Seventy four first-time mothers completed the first set of questionnaires which were distributed in hospital; 71 of those mothers completed and mailed the second package of questionnaires; and, 64 mothers returned the third package of questionnaires. Eighty seven percent of the mothers participated in the final measurement period of the study. In the following description of the sample, values may not reflect the expected totals due to missing data.

In the study, the primiparas ranged in age from 18 to 36 years with a mean age of 26.83 years. The majority (87.5%) of the mothers were married (n=63). Four mothers were living with their boyfriends, four were single and one mother was divorced or separated. Most mothers had college (n=26), university (n=19), or high school (n=19) education. The occupations that the mothers listed were categorized according to the Pineo-Porter-McRoberts socioeconomic classification (Pineo, 1984). The majority of the subjects were Skilled (n=16) or Semi Skilled Clerical or Sales (n=11) employees, Employed Professionals (n=10), or Semi-Professionals (n=9). Five study participants were students. The category of "student" was added to the list for purposes of this study because of the high student population accessing the medical facility which is a part of the University

campus. The mean yearly family income for the sample was $30,000 to $39,999. The mode for income was $50,000 and over. General characteristics of the mothers are shown in Table 1.

Table 1

Description of the Sample

Variable	n	Percent
MARITAL STATUS		
Married	63	87.5
Living with Boyfriend	4	5.6
Single	4	5.6
Divorced or Separated	1	1.4
EDUCATION LEVEL		
Grade School	1	1.4
High School	19	27.1
College	26	37.1
University	19	27.1
Postgraduate	5	7.1
OCCUPATION		
Self Employed Professional	1	1.5
Employed Professional	10	14.7
High Level Management	1	1.5
Semi Professional	9	13.2
Technician	5	7.4
Middle Management	3	4.4
Skilled Clerical or Sales	16	23.5
Semi Skilled Clerical or Sales	11	16.2
Student	5	7.4
Unemployed	7	10.3
YEARLY FAMILY INCOME		
Less than $9,999	2	3.0
$10,000 - $19,999	11	16.4
$20,000 - $29,999	6	9.0
$30,000 - $39,999	7	10.4
$40,000 - $49,999	18	26.9
$50,000 and over	23	34.3

Employment Status

Approximately 82% (n=59) of the participants were employed during the pregnancy. The distribution of time worked during the pregnancy is as follows: 11.1% (n=8) of the participants worked six months or less, 6.9% (n=5) worked seven months; 41.7% (n=30) worked 8 months; and, 22.2% (n=16) worked nine months. The mothers' reported plans to return to work varied from less than one month (2.8%, n=2) to unsure (11.3%, n=8) to never (8.5%, n=6). The mode for the mothers' plans to return to work was six months after the birth (19.7%, n=14).

At three weeks, 74.3% (n=52) of mothers reported that they were on maternity leave, one mother was working part-time, one was self-employed, and 22.9% (n=16) were unemployed. One student had returned to university at one week postpartum and one mother had returned to work at four weeks postpartum. In comparison, at seven weeks, the majority of mothers remained on maternity leave (69.8%, n=44) or were unemployed (22.2%, n=14) whereas the number of mothers employed part-time had increased (7.9%, n=5). Four percent (n=3) of mothers had returned to work within the first six weeks postpartum.

Birth and Postnatal Information

The infants in this study were born between January and March of 1992. The time of the births ranged from 0018h to 2352h. Thirty four male (47.2%) and 38 female (52.8%) infants were born to the mothers in the study. The birth weight of the infants varied from 2126 grams to 4423 grams with a mean of 3352 grams. Thirty one percent (n=22) of mothers reported that their infants were born prior to the due date with the number of weeks preterm ranging from one week (n=9) to 6 weeks (n=1) with a mean of 2.23 weeks. No newborns required care in the Neonatal Intensive Care Unit. Thirty one percent (n=22) of mothers indicated that their babies were born post-term. The number of post-term days ranged from two days (n=1) to 14 days (n=1) with a mean of 6.77 days.

Therefore, with the exception of one infant, all babies were born within the normally accepted range of 37 - 42 weeks gestation.

The length of the labour and delivery of the mothers in this study ranged from one hour (n=1) to 30 hours (n=2) with a mean of 12 hours. Sixty seven percent (n=48) of mothers reported having an episiotomy while 32.4% (n=23) did not have this procedure performed. Of those mothers who had an episiotomy, 44.9% (n=22) indicated that discomfort from the site kept them from sleeping; 55.1% (n=27) found that their sleep was not disrupted by discomfort from the episiotomy.

Ninety six percent (n=68) of mothers stated that their babies were rooming-in with them on a 24 hour basis; 4% (n=3) of the babies were with the mothers during daytime only. The medical facility from which the mothers were recruited does have a 24 hour rooming-in policy unless medical problems contraindicate the practice Mothers in the study anticipated a hospital stay from one to eight days with 59.7% (n=43) of mothers expecting to be discharged on their third postpartum day.

Health Problems

Only 12.7% (n=9) of mothers reported that problems had occurred during the labour or delivery. Other than blood loss and forceps delivery which were each reported twice, the problems unique to a particular participant included increased blood pressure, decreased blood pressure, a pinched nerve causing back pain, manual extraction of the placenta, increased temperature and pre-eclampsia. Approximately 9% (n=6) of the babies encountered problems during the labour and delivery such as bradycardia (n=2), meconium in the amniotic fluid (n=2), irregular heart beat (n=1) and injury to the jaw muscles (n=1).

Of the 4.2% (n=3) of mothers who did have health problems during the immediate postpartum period, items reported were blood clots (n=1), a rash (n=1) and anemia (n=1). Sixteen percent (n=11) of babies had health problems during hospitalization. The description that the mothers gave included jaundice (n=6), jaundice, low weight gain, and

hip dislocation (n=1), diarrhea (n=1), baby was mucousy (n=1), low weight gain (n=1), and feeding problems (n=1).

At three weeks, 14.3% (n=10) of mothers stated that they had health problems in the previous three weeks. These concerns encompassed the flu (n=3), a cold (n=1), mastitis (n=1), stomach pains (n=1), a rash (n=1), uterine infection (n=1), cystitis (n=1) and a postpartum depression (n=1). In comparison, at seven weeks, 19% (n=12) of mothers indicated that they had health problems within the past three weeks. The problems reported were colds (n=7), the flu (n=1), mastitis (n=1), cystitis (n=1), sore knees (n=1) and a throat infection (n=1).

At three weeks, 30% (n=21) of the babies had health problems in the past three weeks. The concerns were a cold (n=4), a blocked tear duct (n=4), a rash (n=1), colic (n=1), cystitis (n=1), low weight gain (n=1), vomiting (n=1), formula intolerance (n=1), thrush (n=1), impetigo (n=1), infection around the breast tissue (n=1), jaundice and constipation (n=1), a blocked tear duct and formula intolerance (n=1), feeding problems and gas pains (n=1), and a cold and gas pains (n=1). At seven weeks, 25.4% (n=16) of the babies had health problems in the previous three weeks. These problems included colds (n=7), jaundice (n=1), a blocked tear duct (n=1), an ear infection (n=1), gas pains (n=1), constipation (n=1), a cold and an ear infection (n=1), colic and a bladder infection (n=1), and colic and a cold (n=1).

Treatment for Depression

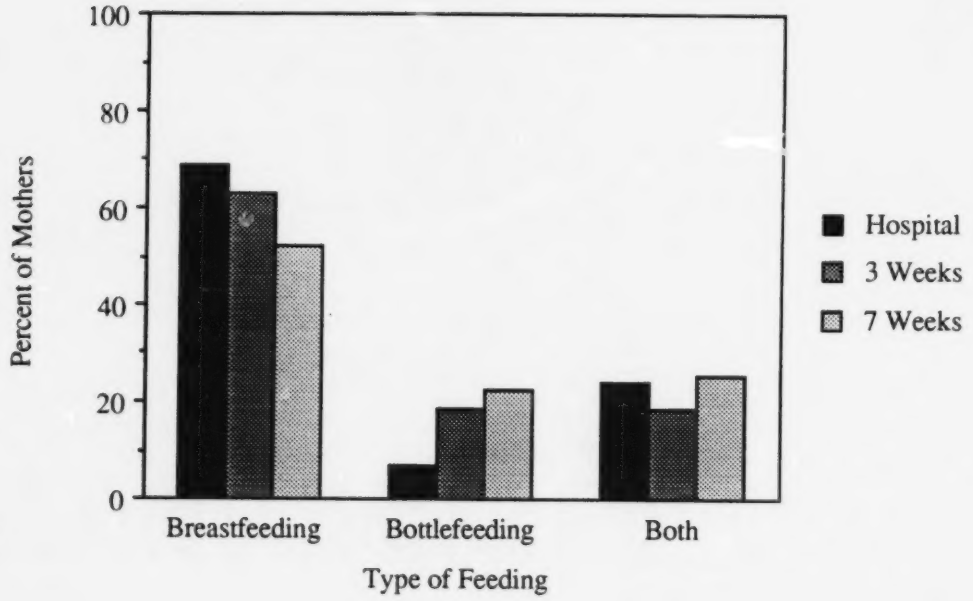
Seven percent (n=5) of the mothers responded at three weeks that they had a history of treatment for depression. The diagnoses had been made during the pregnancy (n=1), the postpartum period (n=1), one to five years ago (n=2) and six to 10 years ago (n=1). The numbers remained the same at seven weeks, except that one more person stated that she had been treated for a depression one to five years ago (n=3; Total 9.5%, n=6). No significant correlations were found between a history of treatment for depression and the POMS Depression scores at three and seven weeks.

Infant Feeding

While in hospital, 69% (n=49) of mothers reported that they were breastfeeding only, 7% (n=5) were bottlefeeding only and 23.9% (n=17) were breast and bottlefeeding. At three weeks, 62.9% (n=44) of mothers were breastfeeding only, 18.6% (n=13) were bottlefeeding only and 18.6% (n=13) were both breast and bottlefeeding. In contrast, at seven weeks, 52.4% (n=33) of mothers were breastfeeding only, 22.2% (n=14) were bottlefeeding only and 25.4% (n=16) were both breast and bottlefeeding. A comparison of feeding practices over time is presented in Figure 1.

In reference to the introduction of solid foods, 90.5% (n=67) of the mothers at three weeks indicated that their babies were not on any solid food; 9.5% (n=7) of the respondents had not answered the question. At seven weeks, 81.1% (n=60) of the mothers reported that their babies were not given solid food, 4.1% (n=3) had started introducing solids, and 14.9% (n=11) did not answer the question. Cereal was the only type of solid food introduced to the infants at seven weeks.

Figure 1. Feeding practices over time.



Fussing and Crying Behaviors of the Infants

When examining the three measurement periods, the majority of mothers initially thought that, compared to what they expected, their babies fussed and cried less often (64.8%, n=46) (Table 2). There was a trend in the data towards an increased number of mothers rating the fussing and crying behavior of their babies as about the same as other infants of a comparable age at three and seven weeks (24.3%, n=17; 41.3%, n=26). Those mothers who believed their infants to fuss and cry excessively remained relatively constant across all time periods (5.6%, n=4; 5.7%, n=4; 4.8%, n=3). The number of mothers who were undecided changed slightly (9.9%, n=7; 12.9%, n=9; 9.5%, n=6). When asked at three weeks and seven weeks, 31.4% (n=22) and 28.6% (n=18) of mothers, respectively, claimed that their babies had fussed and cried more than usual in the past 24 hours.

Table 2

Infants' Fussing and Crying Behavior In Comparison to Mothers' Expectations

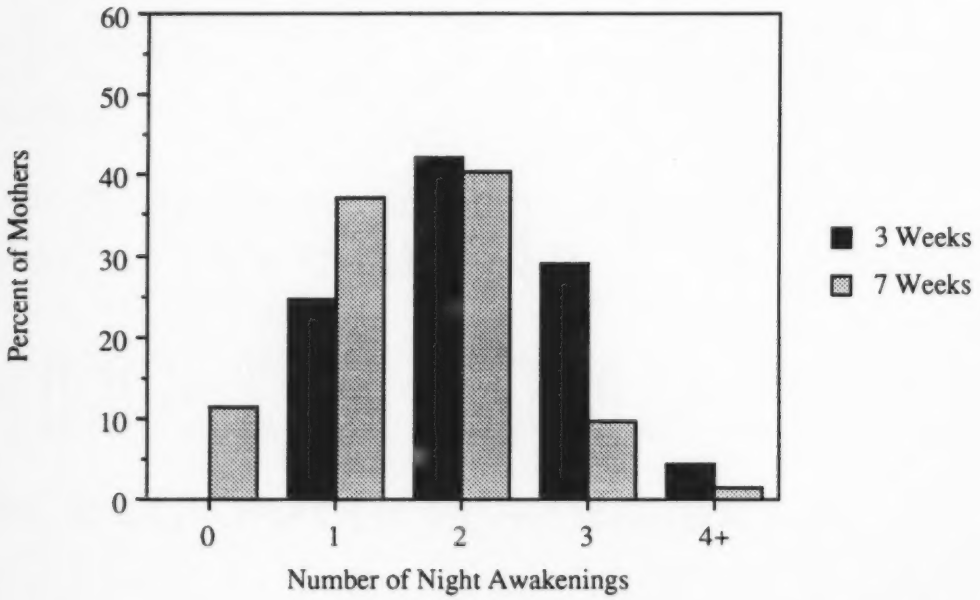
Fussing and Crying	Hospital		3 Weeks		7 Weeks	
	n	%	n	%	n	%
Less Often	46	64.8	40	57.1	28	44.4
More Often	4	5.6	4	5.7	3	4.8
About the Same	14	19.7	17	24.3	26	41.3
Undecided	7	9.9	9	12.9	6	9.5
TOTAL	71	100.0	70	100.0	63	100.0

Night Awakenings

Although the babies tended to be awakening during the night less often as they became older, the majority were still waking twice a night at both three and seven weeks (Figure 2). Specifically, at three weeks, the subjects had responded that they were usually

up at night with the baby zero (0%, n=0), one (24.6%, n=17), two (42.0%, n=29), three (29.0%, n=20) or four or more times (4.3%, n=3). Alternately, at seven weeks, the mothers were up during the night zero (11.3%, n=7), one (37.1%, n=23), two (40.3%, n=25), three (9.7%, n=6), or four or more times (1.6%, n=1). A comparison over time demonstrated that fewer mothers stated that their sleep was disturbed more than usual the previous night. At three weeks and seven weeks, respectively, 68.1% (n=47) and 85.7% (n=54) indicated that their previous night of sleep was not disrupted more than usual, 29% (n=20) and 14.3% (n=9) stated that it was more disrupted, and 2.9% (n=2) and 0% (n=0) were undecided.

Figure 2. Night awakenings over time.



Household Help

While in hospital, 79.2% (n=57) of the mothers responded that household help would be available when they went home with the baby whereas 20.8% (n=15) of the mothers would not have help. The number of mothers with household help increased at

three weeks (90%, n=63) and then remained relatively constant at seven weeks (92.1%, n=58). Conversely, 10% (n=7) and 7.9% (n=5) of mothers had no household help at three and seven weeks. Numerous relatives and friends were listed as the people who would help with the household. However, after discharge and at three weeks, respectively, the majority of the mothers were relying on their husbands or boyfriends (29.6%, n=21; 67.1%, n=47), their mothers (9.9%, n=7; 5.7%, n=4) or their husbands/boyfriends and their mothers (14.1%, n=10; 4.3%, n=3) while at seven weeks their husbands or boyfriends (83.9%, n=52) were providing most of the household help. Thus over time, the mothers were helped around the household more by their husband/boyfriends and less by people external to the nuclear family.

Help With Infant's Care

Ninety percent (n=63) of mothers at three weeks and 87.3% (n=55) of mothers at seven weeks indicated that they had help with the baby's care. The majority of the assistance came from the husband or boyfriend (67.1%, n=47; 75.8%, n=47) with numerous close relatives also listed as sources of help.

Break From the Baby

The majority of mothers were able to take a break from the baby at three weeks (95.7%, n=66) and seven weeks (93.7%, n=59). The person(s) whom the mother could leave the baby with at those time periods was most often cited as her husband or boyfriend (42%, n=29; 30.6%, n=19) or her mother (13%, n=9; 6.5%, n=4), although a number of relatives, friends, or combinations of such were listed. Mothers commonly reported at both time periods that they were able to take a break either daily or as needed. Specifically, the frequency of the break from the baby at three weeks and seven weeks, respectively, was not at all (6.3%, n=4; 8.2%, n=4), daily (32.8%, n=21; 32.7%, n=16), once a week (15.6%, n=10; 22.4%, n=11), two times per week (10.9%, n=7; 8.2%, n=4), three times per week (1.6%, n=1; 4.1%, n=2), every two weeks (0%, n=0; 2.0%, n=1), as needed (29.7%, n=19; 20.4%, n=10), and infrequently (3.1%, n=2; 2.0%, n=1).

Postpartum Day and Time of Instrument Completion

Participants were asked to fill in the anticipated date of discharge, as well as, the date that the questionnaires were completed. From this information, the corresponding postpartum days were calculated by the researcher. The mothers' anticipated postpartum day of discharge ranged from one to eight days with a mean of 3.32 days. The questionnaires were completed in hospital between postpartum days one and seven with most mothers completing the items on their second (36.6%, n=26) or third (36.6%, n=26) postpartum day ($\underline{M}$=2.58). One mother completed the questionnaires on her eighth postpartum day and another on her fourteenth postpartum day at home. These data were not included in the analysis.

At three weeks, or the second time period, the questionnaires were reported as being completed between 17 and 35 postpartum days with a mean of 22 days and a mode of 21 days. It was decided that data from one set of questionnaires that was completed at 52 days postpartum was beyond the parameters of the measurement period and, therefore, was not used. Based upon the time that the questionnaires were mailed, the researcher is certain that the questionnaires could not have been completed prior to the third or seventh week time period being measured thus there is a degree of error in the dates given by the participants.

Mothers reported completing the final set of questionnaires between 45 and 61 days postpartum. The mean postpartum day at the third measurement period was 50.91 days and the mode was 49 days. Four mothers completed the questionnaires between 57 and 61 days which is theoretically beyond the seven week time frame, however, due to the practicalities of conducting research with new mothers during their postpartum period, the researcher chose to include the data from those participants. One subject completed the third questionnaire on her eightieth postpartum day. This data was excluded from the analysis.

The time of completion of the questionnaires was as follows: while in hospital, the time of day varied from 0725h to 2245h with the mode centered around 1200h. During the three week time period, the time of day that the items were completed ranged from 0145h to 2330h with the mode focused around 1400h. At seven weeks, the mothers completed the questionnaires between 0740h and 2347h with the mode centered around 1200h.

Findings From the Research Questions

Reliability and Validity of the VAS-F

Reliability analysis was completed on the VAS-F scale. Internal consistency measures of the VAS-F were calculated over the three time periods: hospitalization, three weeks, and seven weeks. The Cronbach's α for the VASF and VASE subscales ranged from 0.87 to 0.94. The alpha coefficients for both subscales across the three time periods are reported in Table 3.

Table 3

Alpha Coefficients for Fatigue and Energy Items on the VAS-F Scale Over Time

Items	Hospital		3 Weeks		7 Weeks	
	n	α	n	α	n	α
VASF	67	0.92	68	0.94	63	0.94
VASE	71	0.87	69	0.90	63	0.94

Pearson Correlations were used to establish the concurrent validity of the VASF and the VASE subscales with the POMS Fatigue and Vigor subscales over the three measurement periods (Table 4). A one tailed test was used since the researcher believed that the corresponding fatigue and energy subscales of each instrument were related. Those correlations > 0.30 at $p < 0.01$ were considered significant for determining validity (Lee et

al, 1991) thus concurrent validity of the VASF and the VASE subscales was established with the POMS Fatigue and Vigor subscales for each measurement. According to the criteria outlined by Munro, Visintainer and Page (1986), the strength of the positive relationship between the VASF and the POMS Fatigue subscales was high while the positive relationship between the VASE and POMS Vigor subscales was moderate. Conversely, the strength of the negative relationship between both the VASF and the POMS Fatigue subscales with either the VASE or the POMS Vigor subscales was low to moderate (Table 5).

Construct validity of the VAS-F was then examined using factor analysis. According to Kerlinger (1986) "factor analysis is a powerful and indispensable method of construct validation" (p. 427). Although this type of analysis is critical for validating instruments (Munro et al, 1986), it is acknowledged that construct validity also encompasses the testing of external associations or "determining the extent to which the measures fit in a lawful way into a network of relationships that are expected on the basis of theory" (Mishel, 1989, p. 278). Testing of external associations is beyond the scope of this research.

In this study, the averaged responses to the VAS-F across measures were subjected to factor analysis with Varimax rotation. The cutoff point for the loadings was set at 0.40 (Munro et al, 1986). Three factors were identified from the analysis based on eigenvalues greater than 1.0 (Table 6). Eleven of the thirteen fatigue items loaded under the first factor (0.919 to 0.474). Two of the fatigue items, Items 10 (concentrating) and 11 (carrying on a conversation) loaded on a separate factor (0.826 and 0.908). These two items relate to mental fatigue whereas the other eleven items are associated with physical fatigue. A third factor was found which incorporated the items on the energy subscale. The loadings on the energy factor were very high. Thus through the factor analysis there is evidence to support that the VAS-F items are measuring the respective fatigue and energy factors.

Table 4

Pearson Correlations of VASF and VASE Scores with POMS Fatigue and Vigor Scores Over Time

	Fatigue H	Vigor H	Fatigue 3	Vigor 3	Fatigue 7	Vigor 7
VASF H	.82**					
VASE H		.61**				
VASF 3			.79**			
VASE 3				.70**		
VASF 7					.81**	
VASE 7						.62**

** $\rho < 0.01$ one-tailed

Table 5

Pearson Correlations of VASF and POMS Fatigue Scores with the VASE and POMS Vigor Scores Over Time

	VASF H	Fatigue H	VASF 3	Fatigue 3	VASF 7	Fatigue 7
VASE H	-.41**	-.47**				
Vigor H	-.45**	-.54**				
VASE 3			-.60**	-.55**		
Vigor 3			-.54**	-.49**		
VASE 7					-.58**	-.59**
Vigor 7					-.46**	-.53**

** $\rho < 0.01$ one-tailed

Table 6

Factor Analysis of the VAS-F Fatigue and Energy Items

Item	Fatigue Subscale	Communalities	Loadings
	FACTOR 1		
4	Fatigued	0.898	0.919
1	Tired	0.854	0.889
7	Exhausted	0.854	0.885
2	Sleepy	0.849	0.883
3	Drowsy	0.851	0.870
5	Worn Out	0.798	0.827
12	Desire To Close Eyes	0.695	0.744
13	Desire To Lie Down	0.694	0.731
6	Bushed	0.600	0.673
8	Keeping Eyes Open	0.665	0.561
9	Moving Body	0.596	0.474
	FACTOR 2		
11	Carrying On A Conversation	0.856	0.907
10	Concentrating	0.874	0.826
Item	Energy Subscale	Communalities	Loadings
	FACTOR 3		
2	Active	0.875	0.913
1	Energetic	0.849	0.876
3	Vigorous	0.835	0.843
4	Efficient	0.771	0.813
5	Lively	0.757	0.795

Additional Findings

Pearson Correlations were computed between the VASF and VASE scores and the POMS Fatigue and Vigor scores with the POMS Tension, Depression, Anger and Confusion scores over the three time periods (Table 7). A one tailed test was chosen because the researcher believed that a relationship exists between fatigue and energy and tension, depression, anger and confusion. Significant positive correlations were found between both the VASF and POMS Fatigue scores and the POMS Tension, Depression, Anger and Confusion scores. All of the correlations were significant at the 0.01 level except for VASF H and Depression H, which were significant at $p<0.05$. Alternately, the VASE and POMS Vigor scores were negatively correlated with the POMS Tension, Depression, Anger and Confusion scores. These correlations were significant at $p<0.01$ except for VASE H and Anger H; Vigor H and Anger H; Vigor H and Depression H; and, VASE 3 and Anger 3 which were significant at $p<0.05$.

Table 7

Pearson Correlations of Fatigue and Energy Scores with POMS Tension, Depression, Anger and Confusion Scores Over Time

Hospital	Tension H	Depression H	Anger H	Confusion H
VASF H	.56**	.28*	.31**	.57**
Fatigue H	.66**	.38**	.46**	.69**
VASE H	-.45**	-.29**	-.25*	-.39**
Vigor H	-.46**	-.25*	-.24*	-.47**
3 Weeks	**Tension 3**	**Depression 3**	**Anger 3**	**Confusion 3**
VASF 3	.51**	.38**	.33**	.46**
Fatigue 3	.49**	.40**	.33**	.46**
VASE 3	-.36**	-.36**	-.25*	-.48**
Vigor 3	-.36**	-.41**	-.38**	-.58**
7 Weeks	**Tension 7**	**Depression 7**	**Anger 7**	**Confusion 7**
VASF 7	.45**	.35**	.34**	.51**
Fatigue 7	.52**	.34**	.35**	.52**
VASE 7	-.47**	-.41**	-.40**	-.56**
Vigor 7	-.36**	-.41**	-.40**	-.54**

* $p < 0.05$ ** $p < 0.01$ one-tailed

In summary, the VAS-F was shown to be a reliable and valid instrument in which to measure fatigue in first-time mothers during the postpartum period. The internal consistency of the VAS-F was demonstrated with the Cronbach's α for the VASF and VASE subscales ranging from 0.87 to 0.94. Concurrent validity of the VAS-F Fatigue and Energy subscales with the corresponding POMS Fatigue and Vigor subscales was established using Pearson Correlations. Evidence of construct validity of the VAS-F Fatigue and Energy subscales was supported through factor analysis. Items related to physical fatigue had loadings from 0.919 to 0.474 while the two items associated with mental fatigue had loadings at 0.907 and 0.826. The energy items had high loadings ranging from 0.913 to 0.795. Additional findings illustrated significant positive correlations between the VAS-F and POMS Fatigue scores and the POMS Tension, Depression, Anger and Confusion scores across the three time periods. Alternatively, there were significant negative correlations between the VASE and POMS Vigor scores and the POMS Tension, Depression, Anger and Confusion scores over time.

Levels of Fatigue Reported by the First-Time Mothers During the Postpartum Period

The means and standard deviations for the VASF and VASE scores and the POMS Fatigue and Vigor scores were computed across all time periods (Table 8). The changing pattern of the VASF and VASE mean scores across time is depicted in Figure 3. From this Figure, it is observed that the mean VASF scores are similar during hospitalization and at three weeks and decrease at seven weeks. Alternately, the VASE scores are relatively constant, yet lower, than the VASF scores during hospitalization and three weeks and increase at seven weeks. To compare the VAS-F and POMS levels, the scores were converted to Z-scores. A similar pattern of fatigue and energy levels across time is evident when comparing both the VAS-F and POMS mean Z-scores in Figure 4.

Table 8

Mean and Standard Deviations of the VASF and VASE and POMS Fatigue and Vigor Scores

	Hospital		3 Weeks		7 Weeks	
	M	SD	M	SD	M	SD
VAS-F Fatigue (maximum 100)	49.44	18.65	49.82	18.87	38.18	18.40
VAS-F Energy (maximum 100)	45.92	18.70	45.59	18.76	53.00	18.97
POMS Fatigue (maximum 28)	10.99	6.87	10.47	6.17	7.40	5.73
POMS Vigor (maximum 32)	13.01	6.05	12.40	6.19	15.40	6.73

Figure 3. Mean VAS-F Fatigue and Energy scores over time.

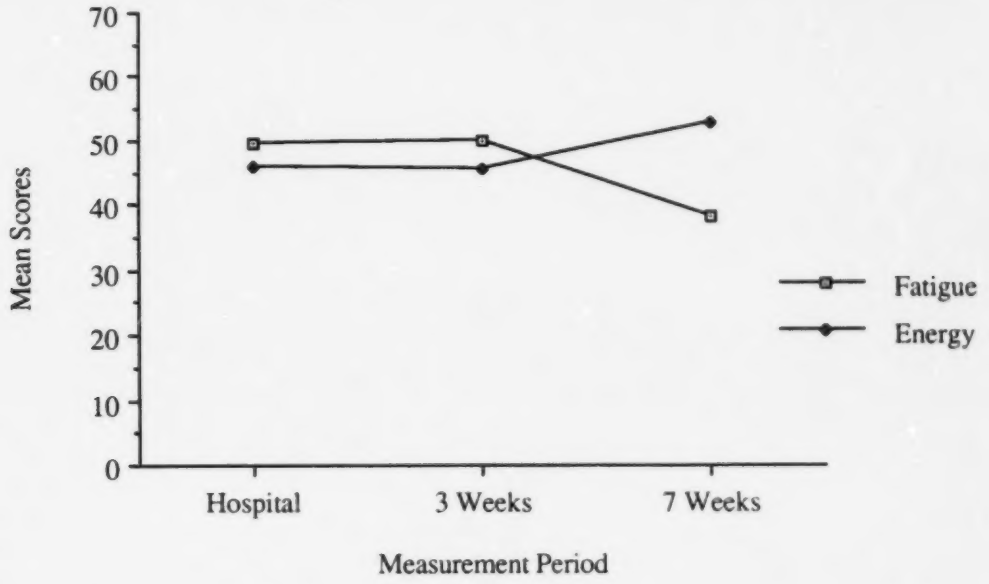
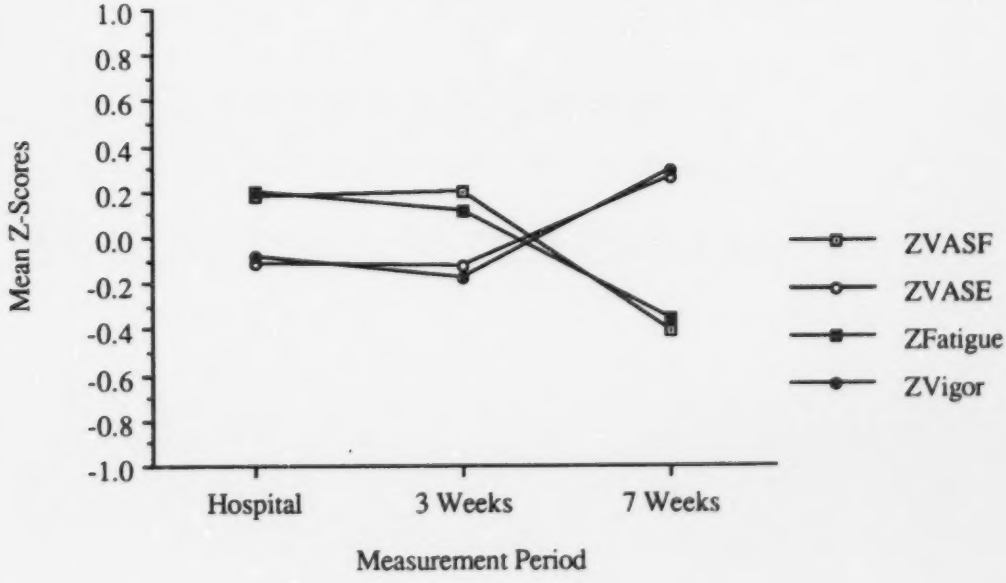


Figure 4. Mean Z-scores for VAS-F and POMS Fatigue and Energy subscales over time.



The mean POMS Fatigue and Vigor scores across the three time periods were converted to standardized t-scores using the Profile Sheet of college student norms provided by McNair et al (1981). A single set of normative scores are utilized on the Profile Sheet since sex differences on the Fatigue and Vigor subscales were not significant in college students (McNair et al, 1981). Caution must be exercised when comparing the Fatigue and Vigor t-scores of college students and those of the postpartum mothers. Data for the college students was based upon a rating of their feelings for the past week while the postpartum mothers were completing the items based upon how they felt "right now". However, given a mean of 50 and a standard deviation of 10 in the normalized t-score distribution for the college students (Thorndike, 1982), it is apparent that the postpartum mothers' reported Fatigue and Vigor scores deviated less than one standard deviation unit from the mean (Table 9).

Table 9

Mean POMS Fatigue and Vigor Standardized T-Scores Over Time

	Standardized T-Scores		
	Hospital	3 Weeks	7 Weeks
Fatigue	51	50	45
Vigor	46	45	50

To further investigate the VAS-F levels of fatigue and energy reported by the mothers over time, stem and leaf displays were constructed (Figures 5 to 10). Stem and leaf displays are a practical method for "initially ordering data and obtaining a visual representation of distribution shape and pattern" (cited in Verran & Ferketich, 1987, p. 143). The stem portion of the display is to the left of the semi colon. It signifies the first digit(s) of the score. The leaves, which are to the right of the semi colon, are the last digit

Figure 5. Stem and Leaf Display of VAS-F Fatigue Scores in Hospital

Frequency	Stem and Leaf
2	0 : 67
3	1 : 269
5	2 : 33689
7	3 : 3355667
19	4 : 0001124444567778889
12	5 : 000112567899
11	6 : 00222488899
5	7 : 16777
2	8 : 46
1	9 : 1

Figure 6. Stem and Leaf Display of VAS-F Energy Scores in Hospital

Frequency	Stem and Leaf
3	0 : 000
1	1 : 2
7	2 : 0145589
14	3 : 00224445567899
18	4 : 000112334566778899
14	5 : 01223444677899
8	6 : 00166678
3	7 : 056
2	8 : 07
1	9 : 6

Figure 7. Stem and Leaf Display of VAS-F Fatigue Scores at Three Weeks

Frequency	Stem and Leaf
5	1 : 05578
7	2 : 0023478
9	3 : 024457899
8	4 : 01235669
17	5 : 11112334455566689
12	6 : 002223456788
9	7 : 001225688
0	8 :
0	9 :
1	10 : 0

Figure 8. Stem and Leaf Display of VAS-F Energy Scores at Three Weeks

Frequency	Stem and Leaf
2	0 : 02
3	1 : 489
9	2 : 012235567
13	3 : 2233446777789
11	4 : 00111223346
14	5 : 01223[illegible]4556689
10	6 : 0013345689
5	7 : 01255
2	8 : 47

Figure 9. Stem and Leaf Display of VASF Fatigue Scores at Seven Weeks

Frequency	Stem and Leaf
5	0 : 05789
10	1 : 1223467889
4	2 : 4468
11	3 : 00113455699
14	4 : 01122224567889
14	5 : 00133344456779
3	6 : 355
2	7 : 68

Figure 10. Stem and Leaf Display of VAS-F Energy Scores at Seven Weeks

Frequency	Stem and Leaf
1	0 : 1
1	1 : 9
8	2 : 00145899
4	3 : 2588
14	4 : 01223567888889
8	5 : 01223456
14	6 : 01122225666789
9	7 : 001244668
4	8 : 1458

of the score (Verran & Ferketich, 1987). The stem widths were equal to 10 and each leaf represented one case.

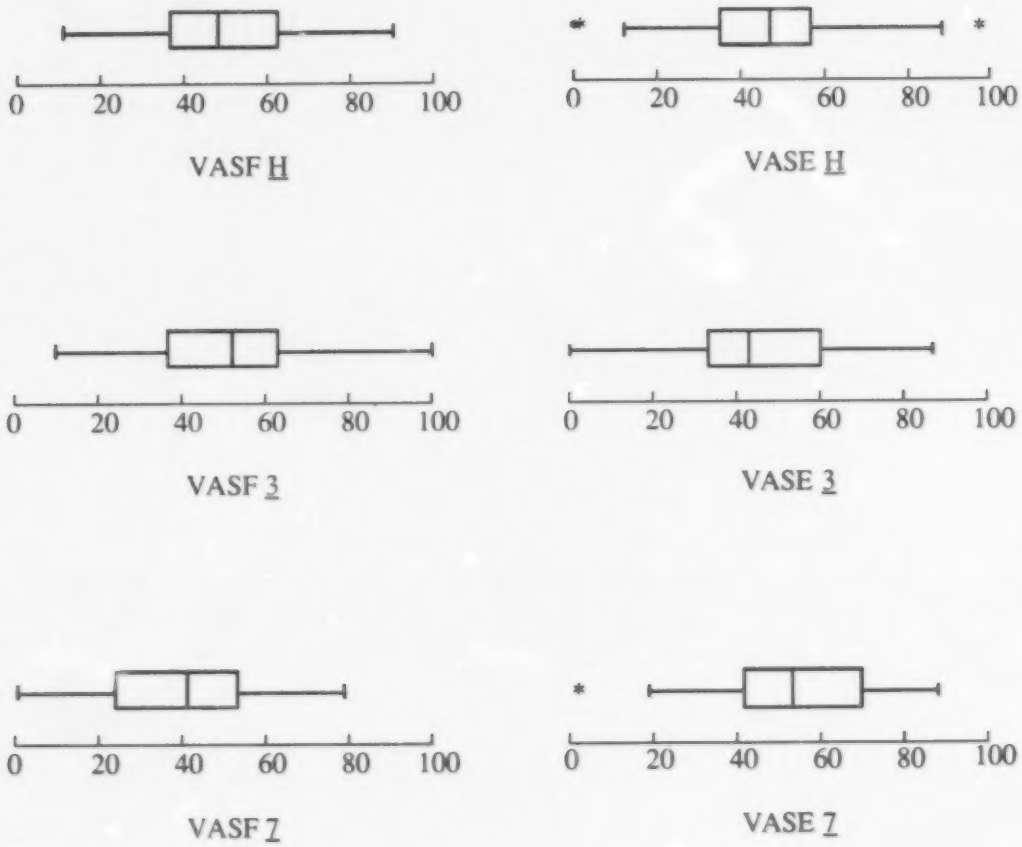
The stem and leaf patterns depict a relatively normal distribution of scores for the VASF and VASE subscales in the first measurement period. For the VASF scores at three weeks, few of the respondents chose the higher ratings of fatigue whereas there was a normal distribution of scores for the corresponding VASE subscale except for a minor decrease at the mid point. At seven weeks, the VASF scores were in somewhat of a bimodal distribution while the VASE scores were in a trimodal distribution.

Boxplots were constructed to provide a visual comparison of the VAS-F data (Figure 11). The box represents the first and third quartiles, or the interquartile range, while a line in the box marks the median. The lines extending from the box, also known as whiskers, are connected to the extreme high and low scores if they are within 1.5 times the interquartile range (Moore & McCabe, 1989). From the VASF and VASE data, it is evident that the size of interquartile ranges do not vary greatly. There is, however, a downward shift of the interquartile range with the VASF 7 scores and, alternately, an upward shift with the VASE 7 scores from the first and second measurement periods. The range of scores is largest at the second measurement time. For each of the subscales, the median is relatively near the mid score of 50 on the VAS-F.

Outliers, or extreme scores, beyond 1.5 times the interquartile range below the first quartile or above the third quartile were plotted with an asterisk. These scores were found only in the VASE data for hospital and at seven weeks. At the low end of the scale, three mothers had energy scores during hospitalization that were outliers. Their fatigue scores were also high but were not shown to be outliers. The participants' Biographical Data Forms were reviewed to gain a profile of any exceptional circumstances that may be contributing to low energy scores. One of the mothers indicated that she had many questions about the baby's care. Her POMS Tension, Depression and Confusion scores

were all relatively high but only during hospitalization. A second mother was new to Canada and her extended family was living in another country. A third mother was found to have low energy scores that were outliers both during hospitalization and at seven weeks. She stated on the Biographical Data Forms that she was breast and bottlefeeding, and at seven weeks her sleep was disturbed more in the previous 24 hours because of the baby's increased fussing and crying during that time. At the high end of the energy scale, one mother's score was an outlier during hospitalization. Her baby was two days post-term, the total time for her labour and delivery was less than two hours, she had no episiotomy and she was bottlefeeding her baby. Her fatigue score was also relatively low.

Figure 11. Boxplots of VAS-F Fatigue and Energy Data



*Outlier

The levels of fatigue and energy reported by the mothers were then analyzed to determine if there were significant differences in the mean VASF and VASE scores and the POMS Fatigue and Vigor scores over the three measurement periods. Repeated Measures ANOVA was computed using the total number of mothers who had completed all VASF and VASE and POMS Fatigue and Vigor subscales across the three measurements (n=57). The conclusions were the same when the individual totals for each subscale were analyzed. Table 10 is the Repeated Measures ANOVA summary tables for postpartum fatigue and energy. Significant differences in fatigue and energy levels on both the VAS-F and POMS tools were found among the three time periods. There were also significant differences in mean scores between the subjects.

Table 10

Repeated Measures ANOVA Results: Postpartum Fatigue and Energy Over Time

VAS-F Fatigue

Source of Variation	SS	df	MS	F Ratio	p
Between Subjects					
Cases	37750.17	56	674.11	3.18	< 0.001*
Within Subjects					
Time	5465.33	2	2732.66	12.90	< 0.001*
Error Term					
Time x Cases	23722.82	112	211.81		

VAS-F Energy

Source of Variation	SS	df	MS	F Ratio	p
Between Subjects					
Cases	38161.35	56	681.45	3.89	< 0.001*
Within Subjects					
Time	2487.26	2	1243.63	7.11	0.001*
Error Term					
Time x Cases	19597.08	112	174.97		

Table 10 Continued

Repeated Measures ANOVA Results: Postpartum Fatigue and Energy Over Time

POMS Fatigue

Source of Variation	SS	df	MS	F Ratio	p
Between Subjects					
Cases	4131.17	56	73.77	3.43	< 0.001*
Within Subjects					
Time	624.01	2	312.01	14.50	< 0.001*
Error Term					
Time x Cases	2409.99	112	21.52		

POMS Vigor

Source of Variation	SS	df	MS	F Ratio	p
Between Subjects					
Cases	4856.96	56	86.73	4.55	< 0.001*
Within Subjects					
Time	399.10	2	199.55	10.48	< 0.001*
Error Term					
Time x Cases	2132.90	112	19.04		

Since significant differences were found in the fatigue and energy levels across time, post hoc analysis using the Tukey-b test was completed. On each of the four subscales, there were significant differences in mean scores between the hospital and seven week time periods, and between the three week and seven week time periods. The VASF and POMS Fatigue mean scores decreased significantly while the VASE and POMS Vigor mean scores increased significantly in these comparisons. There was not a significant change in mean fatigue and energy scores on the VAS-F and POMS instruments between the hospital and three week time periods.

To compare the fatigue and energy levels calculated from the two instruments, the scores from each of the subscales were converted to Z-scores. Repeated Measures ANOVA was computed to determine if there were significant differences between the mean Z-scores on the different types of tools used over the three time periods. Table 11 lists the

Repeated Measures ANOVA summary table for the VASF and VASE and the POMS Fatigue and Vigor mean Z-scores across the three time periods.

Table 11

Repeated Measures ANOVA Results: Postpartum Fatigue and Energy Z-Scores Over Time

Source of Variation	SS	df	MS	F Ratio	p
WITHIN SUBJECTS					
Type	< 0.01	3	< 0.01	< 0.01	1.000
ERROR TERM: Type x Cases	349.18	168	2.08		
Time	1.20	2	0.60	1.84	0.164
ERROR TERM: Time x Cases	36.47	112	0.33		
Type x Time	43.69	6	7.28	13.20	<0.001*
ERROR TERM Type x Time x Cases	185.33	336.0	0.55		

The significant interaction between type of subscale (VAS-F Fatigue and Energy and POMS Fatigue and Vigor) and measurement time ($F=13.20$, $p< 0.001$) indicates that the subjects' mean scores on the different subscales did not change in the same direction over time. Because there was a significant interaction between type of instrument and time, the Tukey-b post hoc test was used to determine which of the subscales had significant differences between them across the three measurement periods. The results concurred with the findings from the individual Repeated Measures ANOVA of each subscale. Significant differences were found in the mean Z-scores on the fatigue and the energy subscales from both the VAS-F and POMS tools between the hospital and seven week measurement periods, and between the three week and seven week measurement periods. The mean VASF and POMS Fatigue Z-scores decreased significantly from hospitalization to seven weeks and, as well, from three weeks to seven weeks. Conversely, the mean VASE and POMS Vigor Z-scores increased significantly from hospitalization to seven

weeks and from three weeks to seven weeks. No significant differences were found in either the fatigue or energy mean Z-scores between the hospital and three week time periods.

From the Tukey-b test, it was also evident that there was a significant interchange between the VAS-F and POMS tools when comparing mean Z-scores for the fatigue subscales during hospitalization and at seven weeks. That is, there was a significant difference in the mean fatigue Z-scores between the VAS-F at hospitalization and the POMS at seven weeks and the POMS at hospitalization and the VAS-F at seven weeks. This pattern was not consistent across the three and seven week comparison or with the VASE and POMS Vigor subscales. In addition, at seven weeks the mean VASF and POMS Fatigue Z-scores were both significantly lower than either the mean VASE or the POMS Vigor Z-scores.

When comparing all of the subscales together in this Repeated Measures ANOVA, time was not significant ($F=1.84$, $p=0.165$) since there was not a consistent pattern in the subjects' mean scores on the subscales. Generally, the fatigue scores decreased while the energy scores increased. Type of subscale, that is the VAS-F Fatigue, VAS-F Energy, POMS Fatigue or POMS Vigor, was also not significant ($F < 0.01$, $p=1.000$). This could be expected given that scores from two different concepts, fatigue and energy, were combined in the analysis.

In summary, the levels of fatigue reported by the first-time mothers changed minimally from hospitalization to three weeks postpartum. A statistically significant decrease in the VAS-F and POMS Fatigue scores was demonstrated from hospitalization to seven weeks postpartum and from three weeks to seven weeks postpartum. The reverse trend was observed with the VAS-F Energy and POMS Vigor scores. That is, insignificant changes were evident from hospitalization to three weeks postpartum. Statistically

significant increases in energy scores were found between hospitalization and seven weeks postpartum and between three weeks and seven weeks postpartum.

Biographical Variables Associated With First-Time Mothers' Level of Fatigue

Data collected on the Biographical Data Forms were analyzed to determine if any of the variables were associated with the mothers' reported levels of fatigue or energy on the VAS-F or the POMS tools. Pearson Correlations (two tailed tests) were used with those questions where the data from the answers were continuous or dichotomous. Oneway ANOVA was computed on questions with categorical answers. Since multiple analyses were performed, it is acknowledged that there was an increased risk of committing a Type I error thus the level of significance was set at $p< 0.01$ for the Pearson's r correlations and $p< 0.05$ for the Oneway ANOVA post hoc analysis using the Scheffe procedure, a conservative test (Munro et al, 1986).

In this section, the findings from those categories of variables that were significantly associated with the mothers' fatigue and energy scores will be presented. Addressed will be preterm and post-term births, infant feeding, infant fussing and crying behaviors, night awakenings and sleep disruption during the previous 24 hours. This will be followed by a report of those variables where no significant relationship with the VAS-F and POMS scores were found.

Preterm and Post-Term Births

No correlation was significant between VAS-F and POMS fatigue and energy scores and if the baby was preterm or the number of preterm weeks (Table 12). There was a weak negative correlation significant at $p<0.01$ between the VASF H scores and if the baby was post-term (VASF H r=-0.34 p=.005). This implies that mothers whose babies were post-term had lower fatigue scores on the VAS-F. The scores on the other subscales including

the POMS Fatigue subscale were not significant at $p<0.01$. The number of days past the due date was also not significantly correlated with the fatigue and energy scores.

Table 12

Pearson Correlations of Fatigue and Energy Scores During Hospitalization with Pre and Post-Term Births

Fatigue Scores	r	p	Energy Scores	r	p
PRETERM:					
VASF H	0.12	.324	VASE H	-0.05	.670
Fatigue H	0.13	.276	Vigor H	-0.06	.635
NUMBER OF WEEKS PRETERM:					
VASF H	0.06	.657	VASE H	0.04	.739
Fatigue H	-0.05	.694	Vigor H	0.05	.666
POST-TERM:					
VASF H	-0.34	.005*	VASE H	0.05	.660
Fatigue H	-0.27	.023	Vigor H	0.14	.254
NUMBER OF DAYS POST-TERM:					
VASF H	-0.27	.025	VASE H	0.03	.787
Fatigue H	-0.22	.067	Vigor H	0.10	.414

Type of Feeding

Hospital. When analyzing the type of feeding during hospitalization, and at three weeks and seven weeks postpartum with the fatigue and energy scores at those time periods, areas of significance were found. From the Oneway ANOVA, it was determined that during hospitalization there were significant differences in the type of feeding and the VASE H, Fatigue H and Vigor H scores but not the VASF H scores (Table 13).

Table 13

Oneway ANOVA Results: Fatigue and Energy During Hospitalization by Type of Feeding

VASF H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1898.60	2	949.30	2.89	0.063
Within Groups	20665.81	63	328.03		
Total	22564.42	65			

VASE H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	3402.23	2	1701.12	5.44	0.007*
Within Groups	20940.42	67	312.54		
Total	24342.65	69			

Fatigue H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	491.09	2	245.55	6.08	0.004*
Within Groups	2706.75	67	40.40		
Total	3197.84	69			

Vigor H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	497.47	2	248.74	8.58	0.001*
Within Groups	1943.10	67	29.00		
Total	2440.57	69			

Using the Scheffe test for post hoc analysis, the groups that were significantly different on the mean VASE H scores were as follows: those mothers who were bottlefeeding had significantly higher VASE scores (M=70.64) than those mothers who were breastfeeding (M=43.23). The mothers who were bottlefeeding (M=70.64) also had higher energy scores than those who were both breast and bottlefeeding (M=45.55). No significant difference in energy scores were found between those mothers who were breastfeeding and those who were supplementing.

On the Scheffe post hoc analysis for the POMS Fatigue scores, only one group comparison was significant. The mothers who were breastfeeding (M=12.40) had significantly higher POMS Fatigue scores than those who were bottlefeeding (M=2.20). For the POMS Vigor scores, it was determined that those mothers who were bottlefeeding (M=22.00) had significantly higher POMS Vigor scores than those who were breastfeeding (M=11.65) or those who were both breast and bottlefeeding (M=13.59).

Three Weeks. At three weeks, significant differences in the types of feeding were found only on the VASF and the POMS Fatigue scales administered at that time period (Table 14). No significant differences were determined on the VASE and the POMS Vigor scales.

Table 14

Oneway ANOVA Results: Fatigue and Energy at Three Weeks by Type of Feeding

VASF 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	2380.73	2	1190.36	3.60	0.033*
Within Groups	21479.52	65	330.45		
Total	23860.25	67			

VASE 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1450.26	2	725.13	2.13	0.127
Within Groups	22477.45	66	340.57		
Total	23927.71	68			

Table 14 Continued

Oneway ANOVA Results: Fatigue and Energy at Three Weeks by Type of Feeding

Fatigue 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	277.50	2	138.75	3.96	0.023*
Within Groups	2347.94	67	35.04		
Total	2625.44	69			

Vigor 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	79.18	2	39.59	1.03	0.362
Within Groups	2567.62	67	38.32		
Total	2646.80	69			

The Scheffe test demonstrated that the VASF scores at three weeks were significantly higher for mothers who were supplementing (M=61.82) than for those who were breastfeeding only (M=46.38). No significant difference in VASF scores was determined between those mothers who were breastfeeding and those who were bottlefeeding at this time. For the POMS Fatigue scale, the post hoc analysis using the Scheffe procedure demonstrated that the mothers' scores on this scale at three weeks were significantly higher for those who were supplementing (M=14.46) than for those who were bottlefeeding (M=8.38).

Seven Weeks. At seven weeks, there was a significant difference in the mean VASF scores according to type of feeding but no difference was demonstrated for the VASE or POMS Fatigue and Vigor scores (Table 15).

Table 15

Oneway ANOVA Results: Fatigue and Energy at Seven Weeks by Type of Feeding

VASF 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	4191.76	2	2095.88	7.49	0.001*
Within Groups	16789.09	60	279.82		
Total	20980.86	62			

VASE 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1746.88	2	873.44	2.55	0.087
Within Groups	20570.65	60	342.84		
Total	22317.52	62			

Fatigue 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	224.05	2	112.02	3.71	0.030
Within Groups	1813.03	60	30.22		
Total	2037.08	62			

Vigor 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	143.62	2	71.81	1.62	0.207
Within Groups	2663.46	60	44.39		
Total	2807.08	62			

From the Scheffe procedure, it was found that mothers who both breast and bottlefed their babies (M=50.18) had significantly higher VASF scores at seven weeks than those who breastfed only (M=37.24) or bottlefed only (M=26.66). No cells were significantly different when the Scheffe test was performed with the POMS Fatigue data.

Introduction of Solids

No mothers had reported that solids had been introduced to the infants prior to three weeks of age. Cereal was the only solid food given to some infants at seven weeks, however, no significant relationships were found between the introduction of solids and the fatigue and energy scores at this time (Table 16).

Table 16

Pearson Correlations of Fatigue and Energy Scores at Seven Weeks with Introduction of Solids

Fatigue Scores	r	p	Energy Scores	r	p
VASF 7	0.03	.843	VASE 7	-0.02	.873
Fatigue 7	-0.12	.347	Vigor 7	0.18	.166

Infant Fussing and Crying Behaviors

Hospital. Using Oneway ANOVA, no significant differences were found in the fatigue and energy scores during hospitalization and the amount of fussing and crying of the infants in comparison to the mothers' expectations (Table 17).

Table 17

Oneway ANOVA Results: Fatigue and Energy During Hospitalization by Fussing/Crying

VASF H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	15.26	3	5.09	0.01	0.998
Within Groups	22941.91	63	364.16		
Total	22957.17	66			

VASE H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	110.99	3	37.00	0.10	0.958
Within Groups	23866.13	66	361.61		
Total	23977.12	69			

Table 17 Continued

Oneway ANOVA Results: Fatigue and Energy During Hospitalization by Fussing/Crying

Fatigue H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	18.99	3	6.33	0.13	0.941
Within Groups	3157.59	66	47.84		
Total	3176.57	69			

Vigor H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	80.58	3	26.86	0.75	0.526
Within Groups	2359.99	66	35.76		
Total	2440.57	69			

Three Weeks. Oneway ANOVA was conducted to determine if there was a relationship between the infants' fussing and crying and the mothers' fatigue and energy levels. No significant differences were found at three weeks on any of the scales completed at this time period (Table 18). For Fatigue 3, although F=3.08 p=.033, no cells were significantly different using the Scheffe post hoc test.

Table 18

Oneway ANOVA Results: Fatigue and Energy at Three Weeks by Fussing/Crying

VASF 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1521.34	3	507.11	1.45	0.236
Within Groups	22338.91	64	349.05		
Total	23860.25	67			

VASE 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1463.95	3	487.98	1.41	0.247
Within Groups	22463.76	65	345.60		
Total	23927.71	68			

Table 18 Continued

Oneway ANOVA Results: Fatigue and Energy at Three Weeks by Fussing/Crying

Fatigue 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	322.31	3	107.44	3.08	0.033
Within Groups	2303.13	66	34.90		
Total	2625.44	69			

Vigor 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	191.90	3	63.97	1.72	0.172
Within Groups	2454.90	66	37.20		
Total	2646.80	69			

Seven Weeks. Similar to the immediate postpartum period and three weeks postpartum, no significant differences were found at seven weeks between the mothers' fatigue and energy scores and the amount of the infants' fussing and crying behavior. The findings from the Oneway ANOVA are presented in Table 19.

Table 19

Oneway ANOVA Results: Fatigue and Energy at Seven Weeks by Fussing/Crying

VASF 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1490.75	3	496.92	1.50	0.223
Within Groups	19490.11	59	330.34		
Total	20980.86	62			

VASE 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	956.38	3	318.79	0.88	0.457
Within Groups	21361.14	59	362.05		
Total	22317.52	62			

Table 19 Continued

Oneway ANOVA Results: Fatigue and Energy Scores at Seven Weeks by Fussing/Crying

Fatigue 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	152.11	3	50.70	1.59	0.202
Within Groups	1884.97	59	31.95		
Total	2037.08	62			

Vigor 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	236.48	3	78.83	1.81	0.155
Within Groups	2570.60	59	43.57		
Total	2807.08	62			

When examining increased infant fussing and crying behavior in the past 24 hours, significant correlations were found. At three weeks, fatigue scores were positively correlated and energy scores were negatively correlated with increased infant fussing and crying in the previous day (Table 20). Unlike the third postpartum week period, increased fussing and crying in the past 24 hours was not significantly correlated with the fatigue and energy scores at seven weeks postpartum.

Table 20

Pearson Correlations of Fatigue and Energy Scores at Three and Seven Weeks with Increased Fussing/Crying in the Past 24 Hours

Fatigue Scores	r	p	Energy Scores	r	p
VASF 3	0.36	.003*	VASE 3	-0.40	.001*
VASF 7	0.13	.312	VASE 7	-0.20	.125
Fatigue 3	0.29	.013*	Vigor 3	-0.34	.004*
Fatigue 7	0.02	.853	Vigor 7	-0.05	.678

Night Awakenings

Pearson correlations were computed on the number of times that the mothers reported that they were usually up with the baby at night and their fatigue and energy scores. No significant correlations were found at three weeks with $p<0.01$ although the VAS-F and POMS Fatigue scores were weakly correlated with night awakenings at $p=.017$ and $p=.018$, respectively (Table 21). Similarly, there were no significant correlations with fatigue and energy levels and number of night awakenings at seven weeks.

Table 21

Pearson Correlations of Fatigue and Energy Scores at Three and Seven Weeks with Night Awakenings

Fatigue Scores	r	p	Energy Scores	r	p
VASF 3	0.29	.017	VASE 3	-0.11	.389
VASF 7	0.12	.337	VASE 7	-0.18	.161
Fatigue 3	0.28	.018	Vigor 3	-0.08	.500
Fatigue 7	0.26	.038	Vigor 7	0.03	.829

Disruption of Sleep During the Previous Night

Three Weeks. Oneway ANOVA was conducted on the relationship between fatigue and energy scores and sleep disruption during the past night with the choice of responses being "no", "yes", or "undecided". Significant differences were found in the VAS-F and POMS Fatigue scores but not with the Energy and Vigor scores (Table ?2).

Table 22

Oneway ANOVA Results: Fatigue and Energy Scores at Three Weeks by Sleep Disruption During the Previous Night

VASF 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	2798.84	2	1399.42	4.29	0.018*
Within Groups	20859.49	64	325.93		
Total	23658.34	66			

VASE 3

Source of Variation	SS	df	MS	F Ratio	p
Between Gr[illegible]	1164.22	2	582.11	1.66	0.198
Within Groups	22762.86	65	350.20		
Total	23927.08	67			

Fatigue 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	331.72	2	165.86	4.79	0.012*
Within Groups	2287.53	66	34.66		
Total	2619.25	68			

Vigor 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	163.76	2	81.88	2.18	0.121
Within Groups	2480.44	66	37.58		
Total	2644.20	68			

Using the Scheffe test, it was confirmed that the VASF scores of mothers whose sleep was disrupted more than usual the previous night were higher (M=58.70) than for those mothers whose previous night of sleep was not atypical (M=45.26). The results from the Scheffe analysis for the POMS Fatigue scores concurred with those from the VASF scores, that is, the mothers had higher fatigue scores (M=13.85) if their sleep was disrupted more the previous night than if it was not disrupted any more than usual (M=9.02).

Seven Weeks. Oneway ANOVA was also performed on the data from seven weeks. No significant differences were found in fatigue and energy levels and how the mothers responded to the question of sleep disruption during the previous night at the seven week time period (Table 23). For VASE 7, although F=4.38 at p=.041, the Scheffe test demonstrated no significant difference between cells.

Table 23

Oneway ANOVA Results: Fatigue and Energy Scores at Seven Weeks by Sleep Disruption During the Previous Night

VASF 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1270.61	1	1270.61	3.93	0.052
Within Groups	19710.25	61	323.12		
Total	20980.86	62			

VASE 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1495.25	1	1495.25	4.38	0.041
Within Groups	20822.27	61	341.35		
Total	22317.52	62			

Fatigue 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	20.02	1	20.02	0.61	0.440
Within Groups	2017.06	61	33.07		
Total	2037.08	62			

Vigor 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	35.60	1	35.60	0.784	0.380
Within Groups	2771.48	61	45.43		
Total	2807.08	62			

In summary, the following variables were found to be significantly related to the fatigue or energy scores on the VAS-F or POMS instruments: post-term births, type of feeding, increased fussing and crying during the past 24 hours at three weeks and increased disruption of sleep in the past 24 hours at three weeks postpartum. Conversely, no significant relationships were found between maternal age, marital status, education level, occupation, months employed during pregnancy, present employment status, time when the mothers had returned to work, if applicable, and the VAS-F and POMS fatigue and energy scores across the three time periods. Similarly, in terms of the obstetrical and the immediate postnatal history, no significant associations were found between the fatigue and energy scores and length of labour and delivery, time of birth, infant's birth weight or gender, if an episiotomy had been performed and if there was any associated discomfort from the site that interfered with the mothers' ability to sleep. There was a weak positive correlation between daytime only rooming-in and the POMS Vigor scores (Vigor H r=0.35 p=.003), however, this finding was not supported on the other scales. Generally, the maternal or infant health problems during the three time periods were not significantly correlated with the fatigue or energy scores, with the one exception of a weak negative correlation with the VASE scores and infant health concerns at seven weeks (VASE 7 r=-0.34 p=.007). Maternal history of treatment for depression was also not significantly associated with the fatigue and energy scores. There was no significant relationship between fatigue and energy scores and the availability of help with the household or the infant's care and taking a break from the baby. Finally, anticipated postpartum day of discharge, present postpartum day and time were not significantly correlated with the VAS-F and POMS fatigue or energy scores. Scatterplots of each of the correlations between fatigue and energy scores and time of completion were constructed (Appendix H). No extreme scores were found to be significantly influencing the correlations computed. Summary tables for each of the variables listed that were not significantly associated with the fatigue and energy scores from the VAS-F or POMS are reported in Appendix G.

Factors First-Time Mothers Identify as Contributing to Postpartum Fatigue

Study participants were asked the following question on the Biographical Data Forms at three weeks and at seven weeks: "Some mothers say that fatigue is a concern after having a baby. Do you agree?" Approximately 87% and 90% of mothers at three weeks and seven weeks, respectively, agreed that indeed fatigue is a postpartum concern (Table 24). Although the number of mothers who responded that fatigue is not a concern remained relatively constant during the two measurement periods (4.3%, n=3 and 4.8%, n=3), the number of mothers who were indecisive decreased at seven weeks (8.6%, n=6 and 4.8%, n=3). This latter pattern was typical of responses to questions where an "undecided" option was given and is supported by the decrease in the mean POMS Confusion scores over time.

Table 24

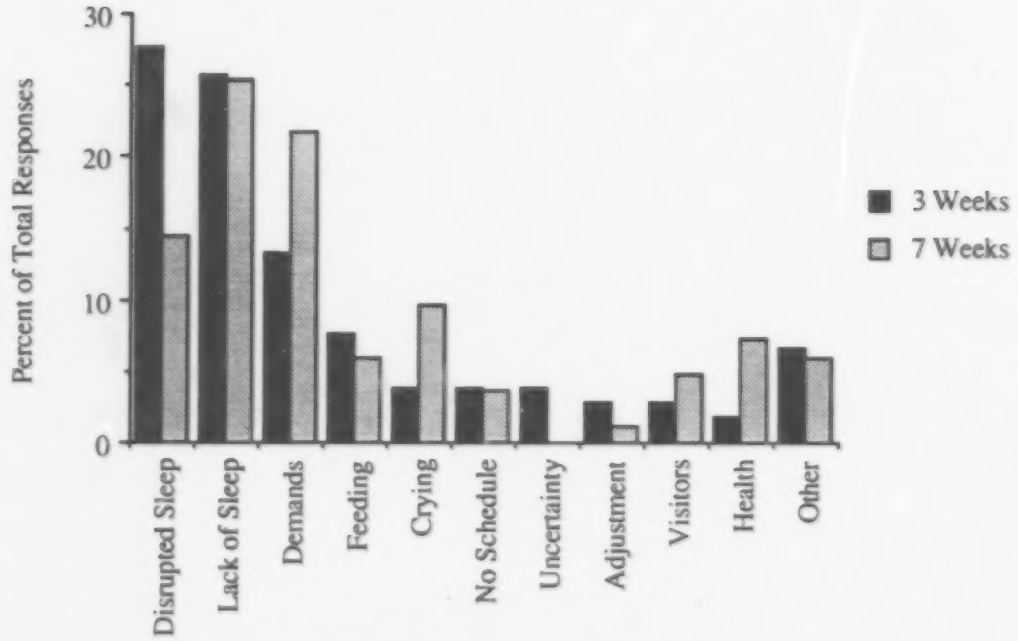
Mothers' Perception of Postpartum Fatigue as a Concern at Three and Seven Weeks

Response	3 Weeks		7 Weeks	
	n	%	n	%
Yes	61	87.1	57	90.5
No	3	4.3	3	4.8
Undecided	6	8.6	3	4.8
TOTAL	70	100.0	63	100.1

Study participants who agreed that fatigue is a postpartum concern were then asked: "what has most directly contributed to your fatigue during the past week?" The written phrases were examined by the researcher for similarities. The responses were then categorized under themes that emerged from the data. Eleven themes were identified from the mothers' responses at three weeks and 10 themes were found at seven weeks (Figure 12) (A table of the data is presented in Appendix I). The themes were common to each time

period, with the exception of "uncertainty about the care of the baby", which was reported at three weeks only. The "other" category at three weeks included items such as moving, shopping for baby articles, marital problems, and one husband had fractured his arm. At seven weeks, the "other" category consisted of resumption of self-employment obligations, taking a post-secondary course, husband unwilling or unable to help as much as the mother expected, and being out of town for a week.

Figure 12. Factors contributing to postpartum fatigue by time periods.



Several trends were evident from the data. The order, from the highest to lowest percentage of times that the categories were identified by the participants, did vary across the two time periods (Figure 12). "Disrupted Sleep", "Lack of Sleep" and "Constant Demands" were the three most common themes at both measures, however, this order changed at seven weeks to "Lack of Sleep", "Constant Demands" and "Disrupted Sleep". "Lack of Sleep" was a common descriptor by the mothers of factors contributing to postpartum fatigue. The mothers did differentiate between "Lack of Sleep" and "Disrupted Sleep" in their comments. For example, references were made to "the broken sleep patterns at night" or "My body is just not used to interrupted sleep". The problem with disrupted sleep patterns was further described by a response about "adjusting to short naps rather than one good, long sleep". At both three and seven weeks, a number of the mothers commented on lack of naps which were a result of being unable to take time, choosing not to sleep during the day, or having problems because it is "very difficult to teach yourself to sleep when baby sleeps". One mother said that when she does not take naps when the baby does, "I get so overtired that sometimes it is difficult to sleep". Another mother explained that "When I get enough sleep I feel fantastic, when I don't I feel grouchy, my legs ache, feel [sic] depressed."

Many of the mothers commented on postpartum fatigue being related to constant demands associated with the care of the baby and the running of the household. One mother wrote that there are "constant demands, emotionally and physically to meet my babies [sic] needs" while others were overwhelmed with the "overall time that is required by baby". The dissonance in balancing the demands was expressed in statements such as "I am trying to keep our . . . house as clean as usual and our affairs in order. It is difficult as I am more concerned about the babies [sic] comfort. Not being able to successfully juggle all things causes me mental fatigue". The mental fatigue was further supported by comments such as the need for "being alert all the time" or "just being 'on call' 24 hours a day". One mother explained that the fatigue is related to "realizing you don't get a "coffee

break" from being a Mom. [You are] constantly being alert for the baby even when sleeping". A theme of continuously "rushing" to meet all of the demands was also evident with some respondents.

Infant feeding including "frequent feeding ... especially at night", demand feeding being "very variable", supplementing, and expressing breastmilk remained fairly constant as contributing to postpartum fatigue over the two time periods. "Lack of a schedule or daily routine", "adjustment to the new role of being a mother", "too many visitors" and "other" were additional categories whereby the percentage of respondents changed minimally over time. The infant's fussing or crying as a contributor to postpartum fatigue did increase from 3.18% (n=4) at three weeks to 9.64% (n=8) at seven weeks. At three weeks, one mother stated that "this time has been quite difficult as the baby is fussing and crying more and feeding has not been very successful. Whereas I was still functioning on adrenalin in the first week, at this point I feel quite fatigued and irritable". Health concerns were also identified more often at seven weeks (7.23%, n=6) than at three weeks (1.90%, n=2).

Measures First-Time Mothers Report As Being Effective in Relieving Postpartum Fatigue

Mothers were asked on the second and third Biographical Data Forms, "What has been useful to help relieve your fatigue during the past week?" Again, the data was summarized and common themes were identified. Thirteen categories were compiled from the three week data and nine categories were determined from the seven week data (Table 25). "Sleep", "Help", "Relaxation Techniques", "Taking a Break" and "Exercise" were the most common measures reported at three weeks and at seven weeks. The ranking order of the items by percentages remained constant except for "Taking a Break" which was listed more frequently at seven weeks than at three weeks. Representative of the items in the "Sleep" category were comments such as "having someone else watch her when she's

awake so I can rest" or "making an effort to rest and sleep when the baby is sleeping". "Help" consisted of family or friends, typically the husband/boyfriend or the maternal grandmother, helping around the home with the cooking, housework, and shopping, as well as, giving assistance with the baby's care. "Relaxation Techniques" included hot baths, music, visualization and massages from the husband. "Taking a Break" was in reference to time away from the baby. One mother stated that "A break from the baby sometime during the day is essential. I find my patience/tolerance is renewed if I have a break for myself during the day". Although a few mothers were beginning to participate in exercise programs, most exercise consisted of going for walks.

Other measures that were reported at both time periods were establishing a daily routine, the mother being cognizant of her own nutrition, support from the "husband" or "talk[ing] to someone who understands", and "nothing" helped to relieve the fatigue during the previous week. At three weeks, additional measures included changing priorities, for example, "keep focused on the fact that my priorities have to change. Baby first, me second and everything else after that", and a supplemental bottle being offered to a breastfed baby in the evenings. In reference to the need for limiting visitors, one mother stated that "I have enjoyed visits from friends, but find that even short visits put [me] so [far] behind that I spend the next day trying to catch up, or end up missing an afternoon nap and get blue in the evening". "Other" measures listed at three weeks were "trying not to react to baby's fussing" and medication to treat a postpartum depression. At seven weeks, three (3.49%) mothers related the postpartum fatigue diminishing to their babies being more settled.

Table 25

Measures Which Relieve Postpartum Fatigue at Three and Seven Weeks

Responses	3 Weeks		Responses	7 Weeks	
	n	%		n	%
Sleep	50	45.87	Sleep	34	39.53
Help	24	22.02	Help	14	16.28
Relaxation	9	8.26	Break	13	15.11
Exercise	6	5.50	Relaxation	10	11.63
Break	6	5.50	Exercise	6	6.98
Support	3	2.75	Baby Settled	3	3.49
Change Priorities	3	2.75	Establish a Routine	2	2.33
Limit Visitors	2	1.83	Nothing	2	2.33
Establish a Routine	1	0.92	Support	1	1.16
Supplemental Bottle	1	0.92	Mother's Nutrition	1	1.16
Mother's Nutrition	1	0.92			
Nothing	1	0.92			
Other	2	1.83			
TOTAL	109	99.99	TOTAL	86	100.00

CHAPTER 5

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

In this chapter, a discussion of the findings of the study are examined as they relate to each of the research questions. This is followed by a summary of the study within the context of Rogers' framework. Limitations of the study and recommendations for future research are given. Finally, implications of the findings for nursing and contributions of the study to nursing practice, education and research are presented.

Research Questions

Reliability and Validity of the VAS-F

The results from this study demonstrate that the VAS-F is a valid and reliable instrument in which to measure fatigue over time in postpartum mothers. Concurrent validity of the instrument was established through demonstrating that the VAS-F Fatigue and Energy subscales were significantly correlated with the corresponding POMS Fatigue and Vigor subscales. Evidence of construct validity of the VAS-F was supported through factor analysis. Internal consistency measures of the VAS-F were also very respectable. These findings concur with those of other studies which support the reliability, validity and sensitivity of visual analogue scales to measure subjective phenomenon (Gift, 1989; Lee et al, 1991; Wewers & Lowe, 1990).

The advantages of a visual analogue scale for the targeted population of this study were evident, given that the intent was not to contribute to fatigue that the first-time mothers may have been experiencing. From a research perspective, the VAS-F was cost efficient, easy to administer, took minimal time for the new mothers to complete, was simple to score and amenable to statistical procedures. For these same reasons, the VAS-F would be suitable for practice if there were concerns about the fatigue a postpartum mother was experiencing and the mutual aim was to quantify her fatigue or energy levels.

Disadvantages in using the VAS-F were few. Although distortion of line length can occur when the instrument is photocopied (Wewers & Lowe, 1990), the problem was minimized through altering the original to accommodate the expected distortion in the copies (Lee, personal communication, July 1991). The copies were then carefully monitored. Also, a trimodal distribution of the scores has been reported with the midpoint and extremes of the scales being the most frequently chosen points (McCormack, Horne & Sheather, 1988). In the present study, there was generally a normal distribution of scores for the first two measures. During the third measure, however, there was somewhat of a bimodal and a trimodal distribution of VASF and VASE scores, respectively. It could be hypothesized that the effects of biographical characteristics of particular subgroups within the sample were becoming more evident as time progressed or perhaps this pattern was due to use of a repeated measures design.

In using the VAS-F in future research, one item on the fatigue scale requires further investigation. A few participants in this study did not respond to, or questioned, the rating of "feeling bushed". One mother commented that, to her, the item was not consistent with the measurement of fatigue but rather was a colloquial term in northern regions for the feeling associated with being isolated in the bush for too long. It is unknown whether other participants did not respond to the item for the same reason although in the factor analysis the loading was 0.673. However, "feeling bushed" deserves further inquiry if the instrument is to be used in northern areas. Also, in future research, consideration should be given to the administration of the VAS-F on consecutive days to obtain a more accurate rating of the mothers' fatigue levels during the measurement period. The influence of a difficult day from increased sleep disruption or increased infant fussing and crying in the past 24 hours on fatigue scores was evident in the present study. Interestingly, time of day that the instruments were completed was not significantly correlated with the fatigue scores.

Levels of Fatigue Reported by First-Time Mothers During the Postpartum Period

The levels of fatigue reported by the first-time mothers changed minimally from hospitalization to three weeks postpartum. There was a statistically significant decrease in fatigue scores from hospitalization to seven weeks postpartum and from three weeks to seven weeks postpartum. Conversely, the reverse trend was evident with the mothers' energy levels. Although there was not a statistically significant difference in energy scores from hospitalization to the third postnatal week, the change in scores at seven weeks postpartum was significantly higher than the previous two measures. Interestingly, the analysis supported the view that although the constructs are interrelated, there is not a perfect inverse relationship between fatigue and energy (McNair et al, 1981). It can be suggested that the fatigue and energy scores were similar initially in this study because of the mothers experiencing the fatigue related to the physical work of labour and delivery and caring for the newborn yet at the same time the energy associated with the euphoria of being a new mother (Clark & Affonso, 1976; Niven, 1992) or as one mother commented "I was functioning on adrenalin".

When relating the findings from the present research to those in the literature, it is acknowledged that few descriptive studies on postpartum fatigue are directly comparable. Differences exist in biographical characteristics of mothers in the samples, measurement periods and instrumentation. General observations, however, deserve comment. First, a consistent trend in the pattern of fatigue is not evident. Although mean fatigue scores were slightly below the midpoint on linear scales used in each of the studies during hospitalization (Gardner, 1992; Milligan, 1989), the patterns subsequently varied. Gardner (1992) reported a steady decrease in fatigue levels over measures at two days, two weeks and six weeks postpartum on the Rhoten Scale yet a curvilinear relationship occurred with an increase at two weeks in fatigue scores from the Beck Depression Inventory. In the present study, as has been discussed, fatigue levels changed minimally

between hospitalization and three weeks but decreased significantly at seven weeks postpartum. It is this six to seven postpartum week measure which seems to reflect a turning point. While Milligan (1989) found the levels of fatigue to peak at six weeks, Gardner (1992) concluded that there were improvements in fatigue scores at the end of this time period. Tulman and Fawcett (1988) stated that 72% of the women who had vaginal deliveries had regained their physical energy by the end of six weeks. In the present study, fatigue scores also decreased significantly at the seven week measure. From the longitudinal data, there is agreement in the further decline of fatigue levels from this time period to three months postpartum (Campbell, Study In Progress 1993; Milligan, 1989). Recovery from childbirth and complete return of functional ability has been found to take at least three to six months (Tulman, Fawcett, Groblewski & Silverman, 1990).

Second, when examining the intensity of fatigue experienced by postpartum mothers within the first eight weeks after childbirth, a pattern is beginning to emerge. The findings of the present study are consistent with those of Gardner (1992) and Milligan (1989) which have demonstrated levels of postpartum fatigue to be approaching, or below, the midpoint of instrumentation utilized. Milligan (1989) confirmed that scores on visual analogue scales used to validate the Fatigue Symptom Checklist, "related to an average level of fatigue just slightly below the midpoint on the scale, that was labelled moderately tired" (p. 210). Although Gardner (1992) classified the mothers in her study to be "mildly fatigued", the mean scores were similarly below the midpoint of the scale. Further, when the POMS Fatigue and Vigor scores in this study were transformed and compared with normative data for college students, the scores deviated less than one standard deviation unit from the mean. How representative are college student scores of a general, healthy population, though? Undeniably, emotional stress and lack of sleep related to course load, assignment deadlines and examinations may have influenced the students' Fatigue and Vigor scores. Do postpartum mothers' fatigue and energy scores need to be compared with normative data from a wider population of healthy women of childbearing age? Moreover, the

mothers overwhelmingly agreed that fatigue is a concern during the postpartum period yet the mean scores centered around the midpoint of the VAS-F. Is there a dimension of postpartum fatigue that is not elucidated in the VAS-F and other instruments that have been utilized to measure postpartum fatigue? Do items need to be developed that are specifically directed towards the measurement of fatigue associated with the emotional stress of motherhood? Clearly, further study is needed in this area.

Third, the existence of a relationship between maternal fatigue levels and postpartum depression has been acknowledged. Fatigue has been implicated as a factor contributing to a mother's vulnerability in developing a postpartum depression (Affonso et al, 1990; Errante, 1985; Gjerdingen et al, 1986; Mercer 1986; Williams, 1967). In the present study, the VAS-F and POMS Fatigue scores were significantly and positively correlated with the POMS Depression scores (one tailed test), although it must be noted that the POMS was not intended to be used as an instrument to diagnose postpartum depression. Whether fatigue is a cause of depression, a consequence, or both, however, is inconclusive (Montgomery, 1983; Potempa et al, 1986). Furthermore, high levels of fatigue are not necessarily an indicator that a mother will develop a postpartum depression. Entwisle and Doering (1981) found "no relationship between degree of tiredness reported at 2 to 3 postpartum weeks and the onset of postpartum depression, but they did find a significant correlation between how tired the woman felt and the seriousness of her depression" (cited in Lentz & Killien, 1991, p. 32). Milligan (1989) also demonstrated "no significant causality over time between postpartum fatigue and depression between six weeks and three months postpartum" (p. 225). The one mother in the present research who indicated that she developed a postpartum depression had moderate POMS Fatigue scores but high Depression, Tension and Anger scores at the three and seven week measurements, despite being on treatment. Thus careful attention needs to be directed towards assessing all of the emotions that a postpartum mother may be experiencing. The issue is further complicated by the fact that many of the normal changes during the postpartum period are similar to

classic depressive symptomatology (Affonso et al, 1990; Hopkins et al, 1984; O'Hara et al, 1984). The VAS-F and POMS Fatigue scores in this study were significantly and positively correlated with the POMS Tension, Anger and Confusion scores (one tailed test). As well, a significant association was not found between a past history of depression and the VAS-F and POMS Fatigue or POMS Depression scores. Pitt's (1968) results support the insignificant relationship between a previous psychiatric history and the development of a postpartum depression but others refute this claim (cited in Affonso & Domino, 1984; Gjerdingen et al, 1986). Unquestionably, postpartum depression is a complex problem. It is apparent that further investigation is needed to clarify the relationship between maternal fatigue and postpartum depression.

Biographical Variables Associated With First-Time Mothers' Levels of Fatigue

In the present study, biographical variables were investigated in relation to postpartum fatigue during hospitalization, at three weeks and at seven weeks postpartum. Although few biographical variables were statistically significant in the analysis, as has been found in other studies (Gardner, 1992; Milligan, 1989), this does not preclude their clinical significance being acknowledged. In Gardner's (1992) study, significant *correlates* with maternal fatigue levels were identified as problems with child care arrangements at two days postpartum. Age and higher education levels were negatively correlated with fatigue scores at six weeks postpartum. Conversely, Mercer (1986) concluded that concern with postpartum fatigue was greater as the age of the mother increased, although mothers of all ages expressed concern about fatigue. Age was not significantly associated with postpartum fatigue in the present study. Milligan (1989) examined *predictors* of postpartum fatigue and found infant difficulty and type of infant feeding (breastfeeding) to be predictors at six weeks postpartum while higher socioeconomic status and infant difficulty were predictors at three months postpartum. Only one buffer of postpartum

fatigue was found, that being social support at six weeks postpartum buffered the effects of infant feeding on the fatigue of bottlefeeding mothers (Milligan, 1989). In the present study, variables that were found to be significantly associated with maternal fatigue were type of infant feeding, increased infant fussing and crying behavior during the previous 24 hours at the three week measure and increased sleep disruption during the past night at the three week time period. Post-term births were negatively correlated with the mothers' fatigue levels during hospitalization.

Post-Term Births

In the postpartum fatigue literature, findings were not available relating gestational age of the newborn to the fatigue experienced by new mothers. In this study, it was found that mothers experienced significantly less fatigue and more energy if the baby was post-term than if the newborn was preterm or term. Unanticipated time would have allowed the employed mothers, who constituted 82% of the sample, a longer period of time upon completion of work, to replenish their energy levels and prepare physically and psychologically for the baby's birth. It could also be postulated that ventures which would deplete energy, other than normal daily activities, were not initiated by the mothers because of the impending labour and delivery.

Type of Infant Feeding

Type of infant feeding was significantly associated with maternal fatigue and energy levels when examined across the three time periods. Results were not consistent on both the VAS-F and POMS instruments, though, with the exception of the measurement during hospitalization. In the immediate postpartum period, conclusive results from both instruments demonstrated that mothers who bottlefed had significantly higher energy levels than those who breastfed or those who supplemented their newborns. Also, there were no significant differences in fatigue or energy levels between mothers who breastfed and those who supplemented. Alternately, mothers who breastfed rated their fatigue levels significantly higher than those who bottlefed (POMS only). At three weeks and seven

weeks postpartum, results were not congruous across both instruments although a pattern was evident. During both measurements, mothers who supplemented had significantly higher fatigue scores than those who solely breastfed (VAS-F only) or bottlefed (POMS: three weeks; VAS-F: three and seven weeks) their newborns.

Supplementing, or breast and bottlefeeding, was the common factor throughout the feeding analysis. In the immediate postpartum period, supplementing required more of a maternal energy expenditure than bottlefeeding but not breastfeeding. It is conceivable that those mothers who indicated that they were breast and bottlefeeding, were primarily interested in breastfeeding but for reasons unknown to the researcher, their infants were also receiving some bottles. During the third and seventh postnatal measurements, those mothers who supplemented had significantly higher fatigue levels than those who breastfed or bottlefed only. Although an association between supplementing and postpartum fatigue was found, it must be cautioned that a causal relationship cannot be formed from the analysis. However, supplemental bottlefeeding during the initial postpartum period has been found to be predictive of breastfeeding problems for mothers who have specifically chosen to breastfeed (Kearney, Cronewett & Barrett, 1990; Kershner, 1982; Marmet & Shell, 1984; Newman & Sterken, 1992).

No comparable findings relating supplemental feeding and maternal fatigue were located in the literature. Milligan (1989) found breastfeeding mothers to have higher fatigue levels than bottlefeeding mothers at the six week measurement only when predictors of fatigue were examined during hospitalization, at six weeks and three months postpartum. A similar finding was not supported in the present research and no conclusions were reported by Milligan (1989) about supplemental feedings. Further, in a study of breastfeeding mothers, fatigue was identified as a major concern during the first four postpartum months (Chapman et al, 1985). In this study, breastfed ($\underline{M}$=2.1; $\underline{M}$=1.5) and bottlefed infants ($\underline{M}$=1.9; $\underline{M}$=1.6) woke, on average, less often at night at three weeks and seven weeks, respectively, than supplemented infants ($\underline{M}$=2.6; $\underline{M}$=2.2). Rubin (1984)

claims that it is the infant feeding patterns during the night that are a cause of maternal fatigue. Clearly, further research is needed in this area.

Infant Fussing and Crying Behavior and Sleep Disruption

Infant fussing and crying behavior and increased sleep disruption during the previous 24 hours were both associated with increased levels of fatigue at three weeks postpartum. Mothers with extreme scores were not found to be significantly influencing the results. Conversely, infant crying was identified as a contributory factor of maternal fatigue more frequently by the mothers at seven weeks than three weeks postpartum. Although Milligan's (1989) design did not incorporate a comparable measure between the immediate and the six week postpartum periods, the researcher did find that infant difficulty as measured by Bates Infant Characteristics Questionnaire was significantly correlated with maternal fatigue levels at six weeks and three months postpartum. In relation to increased sleep disruption, the biographical analyses and the contributory factors listed by the mothers were consistent in demonstrating that the disruption was more of an issue at three weeks than seven weeks postpartum. Three weeks was also found to be the peak period when breastfeeding mothers expressed concern about infants having their days and nights mixed, in a study that was conducted in the first four months after childbirth (Chapman et al, 1985). Sleep disruption and lack of sleep will be discussed further in the next section.

Factors First-Time Mothers Identify as Contributing to Postpartum Fatigue

Mothers in the study overwhelmingly agreed that fatigue is a maternal concern during the postpartum period. Over time, there was an increase in the percentage of mothers who reported that fatigue is a concern after childbirth, from 87.1% at three weeks to 90.5% at the seven week measurement, while those who were indecisive decreased from 8.6% to 4.8% at the corresponding periods. Few mothers indicated that postpartum fatigue is not a concern (4.3% and 4.8%, respectively). At both time periods, the primary factors identified as directly contributing to postpartum fatigue were sleep deprivation, constant

demands, feeding and infant crying. Secondary factors signified by the mothers included lack of routine, uncertainty, adjustment, too many visitors and health concerns.

Sleep deprivation was understandably a fundamental source of maternal fatigue during the postpartum period. This finding was supported in Mercer's (1986) study where the "pervasive fatigue" experienced by primiparas in the first postpartum month was related to sleep deprivation. In the present research, typical progression through the different phases of sleep was altered by both the disruption and decrease in total sleep. Interruptions in sleep have been identified as a more significant concern for some postpartum mothers, though, than loss of sleep (Campbell, 1986). Disrupted sleep was cited less often at the seven week measurement than the three week period, possibly due to the infants developing more regular sleep patterns at this time (Ferber, 1985) or mothers becoming accustomed to night awakenings. Lack of sleep was a major factor at both time periods. Interestingly, in sleep studies, postpartum women have been found to sleep more efficiently through an increase in Stage 4, or deep restorative sleep (Karacan et al, 1969). However, subjective fatigue, as related in the present study, has been shown to be a major problem from the sleep deprivation research conducted (Anch et al, 1988; cited in Bonnet, 1985; Johnson, 1982).

Constant demands associated with care of the infant and running a household were also identified as a primary cause of postpartum fatigue. Dissonance in balancing these demands, in addition to the initial uncertainty in meeting the infant's needs and having no daily routine, created physical and mental fatigue for some first-time mothers. Emotional tiredness in Campbell's research (1986) was "related to the responsibility of providing continuous care for the baby" (pp. 198-199). The continual demands on the mother as a major postpartum concern is supported in other studies (Gruis, 1977; Harrison & Hicks, 1983; Smith, 1989) and specifically associated with postpartum fatigue in Milligan's (1989) research. Of further interest in the present study, though, is the significant increase in constant demands being listed as contributing to postpartum fatigue at the seven week

measurement despite approximately 90% of mothers indicating that they had help with the infant and the household at both time periods. It is unknown whether the mothers utilized the available assistance or if, as Milligan (1989) found, the mothers perceived the assistance to be "useful help" (p. 228). However, it can be postulated that although mothers may have been given additional help in the first few weeks after childbirth, they chose to, or were expected to, assume responsibility for more obligations by seven weeks postpartum. Arguably, a postpartum period following hospitalization with the necessary assistance and support is not recognized nor valued in Western cultures (Stern & Kruckman, 1983).

Feeding and infant crying were other predominant factors the mothers identified as contributing to postpartum fatigue, both of which are frequently listed as common concerns of postpartum mothers (Harrison & Hicks, 1983; Mercer, 1986; Smith 1989). Feeding issues, which remained relatively constant at both time periods, depleted the mothers' energy through the frequency of demand feedings, especially at night, and for some mothers, supplemental feeding. These findings support the biographical data analysis previously discussed in which type of feeding, particularly supplementing, was significantly associated with postpartum fatigue, exclusive of the hospitalization period when breastfeeding mothers had significantly higher fatigue scores than bottlefeeding mothers. In terms of infant crying, the percentage of mothers identifying this factor as contributing to postpartum fatigue increased from 3.18% at three weeks to 9.64% at seven weeks which is consistent with documentation that infant fussing and crying behavior tends to peak around six weeks (Brazelton, 1962; Keefe & Froese-Fretz, 1991). However, in the biographical data analysis, infant fussing and crying in the previous 24 hours was significantly associated with postpartum fatigue at the three week measurement as opposed to the seven week period. Infant crying has been identified as the utmost concern of first-time mothers during the first postpartum month (Mercer, 1986).

Other factors associated with postpartum fatigue that were identified by the mothers were the adjustment to motherhood, too many visitors and health concerns. The fatigue related to the adjustment to motherhood, a major task of primiparas (Brouse, 1988; Mercer 1986; Rubin, 1984) was conceivably psychological in nature. As would be expected, during the first two months postpartum the concern with this factor generally decreased over time. Conversely, too many visitors increased somewhat with time as a contributory factor of postpartum fatigue. New parents are often cautioned about the fatiguing effects of allowing numerous visitors during the initial postnatal period, yet the results from this study demonstrate that the problem shifted to a time when the baby was a few weeks older. In reference to health concerns, there was a considerable increase from the three week to the seven week measurement (1.90% to 7.23%, respectively) in mothers reporting this factor as contributing to their fatigue. This is consistent with the Chapman et al (1985) study, in which the highest incidence of infant illness, more specifically, upper respiratory infections, was reported during the second month. From the biographical data analysis in the present research, there was also a weak negative correlation between infant health problems and maternal energy levels at the seven week measurement although fewer actual episodes of illness were reported at that time period.

Measures First-Time Mothers Report As Being Effective in Relieving Postpartum Fatigue

Mothers identified measures at three weeks and seven weeks after childbirth which they found to be helpful in relieving postpartum fatigue. Empirical evidence is invaluable, considering that no studies have been located to validate the therapeutic effects of various recommendations given by health professionals. The experiential measures which were effective can be broadly categorized as related to the restoration and the conservation of energy.

At both time periods the mothers were clearly focused on energy restoration, perhaps as a basic human instinct in the normal process of adjusting to motherhood. Given the physical and mental exertion of labour and delivery, the demands of being a mother, and the differences between adult and infant sleep/wake and eating cycles, sleep was understandably necessary, if not crucial, for restoration. To cope with the lack of sleep, and, disrupted sleep, the mothers frequently wrote of purposely resting or sleeping when the baby was also in that state. Although it is known that the recuperative effects of napping is not equivalent to uninterrupted sleep (Anch et al, 1988), efforts were made to ensure a sound sleep. For example, mothers would designate somebody to care for the baby so they could forego the need to "listen while sleeping" and to allow for longer periods of unbroken sleep, particularly at night, to correspond with the normal circadian cycle. Further, restoration of energy through exercise, relaxation and maternal nutrition, which are normally recommended and promoted through prenatal classes, were also cited. Relaxation was facilitated through touch (hot baths, massage), sound (music) and visualization. Interestingly, specific relaxation techniques are not necessarily discussed with mothers after childbirth.

Little change was evident in the five primary measures to relieve fatigue provided by the mothers during the study period, those being sleep, help, relaxation, exercise, and "taking a break", however, "taking a break" became more of a priority as time progressed. Deliberate attention to mental restoration was conceivable and desirable once the mothers' basic physical needs were addressed. As evidenced by the mothers' responses, the effective restorative measures found in this study are consistent with the promotion of adequate rest, exercise, nutrition and psychological well-being which are generally advised in the literature to relieve or prevent fatigue (Kellum, 1985).

Conservation of energy was another mechanism that enabled the mothers to gain relief from postpartum fatigue. Next to sleep, help with the household and with the care of the baby was the second most beneficial measure listed by the mothers at both three weeks

and seven weeks postpartum. Constant care taking activities of the baby and the continual exchange of energy through touch, contributed to depletion of maternal energy. Thus help with the infant's care by a trusted person, usually the baby's father or the maternal grandmother, promoted the conservation of the new mothers' energy. Other concrete methods of safeguarding energy were changing priorities, limiting visitors, and establishing a routine. While more emphasis was placed on assistance with physical tasks during the early postpartum period, emotional support was listed by a small number of mothers during both time periods. Qualitative data from a future retrospective study could provide an understanding of the relationship between support and the relief of postpartum fatigue.

Summary of the Study
Within the Context of Rogers' Framework

Rogers' Science of Unitary Human Beings provides an abstract frame of reference for interpreting and understanding the study of postpartum fatigue. In this research, the mothers were primiparas. Experiencing the birth of the first child and the subsequent postpartum period was a time of profound change in the life process of the women. The evolving transition from woman to mother, a unique change which will never be re-experienced in exactly the same manner, or a non-repeating rhythmicity, is representative of Rogers' Principle of Helicy. Rogers defines this principle as the "continuous innovative, unpredictable diversity of human and environmental field patterns" (Rogers, 1990, p. 9). These continuous, unpredictable changes occurring "from lower to higher frequency wave patterns", as defined in the Principle of Resonancy (Rogers, 1990, p. 8), are descriptive of the postpartum period. The unpredictable changes and repatterning were extensive for many of the new mothers.

In the Science of Unitary Human Beings, Rogers (1990) describes people and their environments in terms of energy fields. Thus the postpartum mothers in this study can be

conceptualized as energy fields in coexistence, or continuous process, with the energy fields of their newborns, husbands/boyfriends, extended families and friends and their environments (Principle of Integrality) (Rogers, 1990). When focusing specifically on the phenomenon of fatigue in the postpartum period, Rogers' (1990) Principle of Helicy , or as stated above, the "continuous innovative, unpredictable, increasing diversity of human and environmental field patterns" is again applicable (p. 8). Inherent in this principle is Rogers' (1970) image of the life process evolving "along a spiralling longitudinal axis bound in the curvature of space-time. With each turn of the spiral along the axis, similarities appear. Spirals along the axis are further embedded within the spiralling of the axis itself" (p. 100). The "slinky", a child's toy, is utilized by Rogers (1970) to illustrate this concept. Maternal fatigue during the postpartum period can also be conceptualized in terms of a helix. Patterns of energy depletion and repletion occurred as the mothers encountered fatiguing demands on their energy fields during the postpartum period. Undeniably, each mother's pattern was unique and related to the integral nature of the wholeness of the mother in continuous interaction with her environment. The intent of the present research was not to imply that the pattern of maternal fatigue after childbirth is identical for all new mothers but rather to attempt to gain an in-depth understanding of the phenomenon of maternal fatigue. In this study, when fatigue and energy levels were quantified and described through use of a self-report instrument that was found to be valid and reliable, the mothers' fatigue and energy scores did not vary significantly from hospitalization to three weeks postpartum. Mothers whose infants were born post term actually tended to have lower fatigue scores while in hospital. It can be postulated that these mothers had unanticipated time before the births to replenish their energy fields. Interestingly, when viewing the overall pattern of scores postnatally, the energy scores were only slightly lower than the fatigue scores during the first two time periods. Despite the physical efforts required during the labour and delivery and the demands of continuous care of a newborn, the creation of energy from the profound life experience was apparent. It was not until seven weeks postpartum that

repatterning, or a significant decrease in fatigue levels and an increase in energy levels, was found. This repatterning of diminished fatigue and replenished energy levels may perhaps be attributed to time, experience and effective coping strategies.

It was evident from the findings of the study, that there were numerous demands on the mothers' energy fields. These demands focused mainly on the maternal transfer of energy to the infants' energy fields as was necessitated by the care required of a newborn in the postpartum period. Included were the constant demands associated with infant care and household responsibilities, infant feeding, particularly frequent demand feedings and supplemental feedings, infant fussing and crying behavior, adjustment to motherhood and the associated uncertainty, too many visitors, and health concerns. These factors precipitated disorder, or chaos, in the mothers' normal circadian cycle and other human rhythms with sleep deprivation becoming routine. The effects were physical and mental fatigue. From a Rogerian perspective, though, there were no causal or linear relationships between the variables and levels of fatigue. Admittedly, maternal fatigue during the postpartum period is a complex concern. It can be questioned whether the fatigue associated with the intense demands on the mothers' energy fields is, in fact, encompassed by the broader concept of stress.

Mechanisms utilized by the mothers to cope with the fatigue during the postpartum period were related to the restoration and conservation of the energy fields. Physical, psychological and emotional energy restoration was facilitated primarily through sleep, for example, by having somebody care for the baby so the mother would not have to "listen while trying to sleep" and thus be ensured of a sound sleep, as well as, exercise, nutrition, support and "taking a break". Further, relaxation by means of touch, sound and visualization promoted the transfer of energy to replete the mother's energy field. Conservation of energy transpired through relief from the constant demands of caring for the infant and responsibilities of the household, in addition to changing priorities, establishing a daily routine and limiting visitors. Thus through the restoration and the

conservation of energy the mothers sought to create a repatterning of their energy fields. One mother at three weeks and two mothers at seven weeks indicated that nothing helped to relieve their fatigue. Since they were reportedly unable to replenish their energy fields, one could question if they were progressing towards exhaustion.

In summary, the interpretation of the findings from the study of maternal fatigue are enriched through a Rogerian perspective. Utilizing Rogers' framework as the conceptual basis for the research, however, presents a challenge in the endeavor to remain logically consistent throughout the research design. Moreover, it is possible that many additional findings and relationships exist within the context of Rogers' framework but were not observed in the present study. Rogers' visionary model presents a challenge to nursing research of maternal fatigue - a challenge to question and to seek a new understanding.

Limitations

It is acknowledged that the study is limited by:

1. the investigation of postpartum fatigue only in first-time mothers with healthy newborns;
2. the use of a convenience sample, therefore, external validity may be compromised;
3. the operational definition of the postpartum period being restricted to eight weeks. Although physical recovery normally takes six to eight weeks, the psychological transition for primiparas from woman to mother is a unique experience requiring an indeterminate amount of time;
4. the use of repeated measures which could potentially have had an effect on the subjects' responses;
5. the measurement of maternal fatigue during three intervals as opposed to specific times. Although it would have been ideal to specify a postpartum day and time that the materials were to have been completed, this is not a practical nor reasonable request of new mothers.

Recommendations For Future Nursing Research

Nursing research in the area of maternal fatigue is in the beginning stages of development. Additional descriptive studies are needed to further explore the concept of fatigue during the postpartum period. As well, replication of the existing research is necessary before interventions can be suggested or evaluated. From the research that has been completed in this study, recommendations for future research are directed towards establishing a composite of fatigue norms throughout the postpartum period and refining the measurement of postpartum fatigue.

Since few studies of postpartum fatigue exist, little data is available on the maternal levels of fatigue after childbirth. Measurements should be taken at weekly intervals to gain clarity in the understanding of fatigue patterns experienced by new mothers during the entire postpartum period. Data could be collected on several successive days during each of the time periods to determine if any results were inconsistent for an individual subject. Further, participants could be requested to indicate the least and the most amount of fatigue they recall experiencing over the past week on a single visual analogue scale in addition to the VAS-F. In the quantitative study of fatigue during the postpartum period, there is also a need for the establishment of normative data for primiparas and for multiparas. Fatigue levels deviant from the norms could then be defined. Once maternal fatigue during the postpartum period has been described and replicated, research investigating and evaluating selected interventions could then be conducted.

Several issues related specifically to the measurement of the construct of fatigue have implications for future investigators. First, as has been previously discussed, one item on the VAS-F deserves review. Through further in-depth item analysis with a larger sample size, it could be determined whether or not "feeling bushed" is a colloquial term that has implications for the use of the instrument in northern regions. It would also be interesting to develop and test additional items related to mental fatigue for the postpartum population. Second, the inclusion of the energy items to be independently scored is questioned if the

construct to be measured is fatigue. Admittedly, lack of energy is a common descriptor of fatigue (Hart & Freel, 1982; McFarland & McFarlane, 1989; Piper, 1989; Piper et al, 1989; Voith, Frank & Smith Pegg, 1989). The findings from the present study support the view that although fatigue and energy are interrelated, they are not diametric concepts with a perfect inverse relationship (McNair et al, 1981). Third, construct validity could be enhanced in future research through collecting data on possible physical indicators of fatigue such as information from the chart on the progression of the labour and delivery, estimated blood loss or hemoglobin levels. Fourth, a relationship is acknowledged between fatigue and postpartum depression, however, whether fatigue is a predisposing factor of depression, or a symptom, or both is not conclusive (Montgomery, 1983; Potempa et al, 1986). Consequently, in further quantitative study of postpartum fatigue, instruments measuring postpartum depression could be utilized to enable postnatal depression to be treated as a covariate. Fifth, in future research, it is recommended that selected key biographical variables be chosen for in-depth study. Analysis could be conducted to determine if any of the chosen variables were predictors of significantly higher postpartum fatigue levels, if the concept of prediction was internally consistent with the chosen conceptual framework for the research. Finally, the findings in future studies could also be enriched by utilizing qualitative methods to add depth to the understanding of first-time mothers' experience of fatigue. Questions need to be raised as to whether there is a dimension of postpartum fatigue that is not incorporated into the measurement tools currently available. Moreover, is maternal fatigue encompassed within the broader concept of stress in the postpartum period? It has been demonstrated clearly that there is need for further research of postpartum fatigue.

Implications For Nursing Practice

It is without question that postpartum fatigue exists, in varying degrees, for women after childbirth. The concern arises, however, if health care professionals complacently

accept fatigue as part of the normal recovery process after birth without further attempts to understand what is outside the realm of normalcy, as well as, what health promotion measures can be employed to improve the mother's well-being during that time period. Of further significance is the implication of fatigue as a contributing factor and/or a symptom of postnatal depression (Affonso & Domino, 1984; Affonso et al, 1990; Dalton, 1989; Errante, 1985; Gjerdingen et al, 1986; Mercer, 1986; Pitt, 1968; Williams, 1967). Consequently, nurses need to be knowledgeable, through their basic and ongoing education, about maternal fatigue and the implications of fatigue for new families during the postpartum period.

In practice, childbirth education is offered during the prenatal period with the primary focus being to reduce stress and anxiety through providing "sufficient information to obviate unnecessary worries and to reassure the woman that her experience is normal rather than abnormal" (Niven, 1992, p. 41). While attention is largely directed towards labour and delivery at prenatal classes, anticipatory guidance about the postpartum experience, a more extensive period of time than the actual labour and delivery process, is essential. Information exchanged during the prenatal classes on the normal pattern of fatigue after childbirth, contributing factors and measures which help to relieve the fatigue, can assist the family in their adjustment during the postpartum period. Corresponding information about the nature and pattern of maternal fatigue can also be addressed during hospitalization and through postnatal counselling at home visits, well child visits to public health centers in the community and mothers' postpartum support groups.

Through anticipatory guidance both parents need to know that it is normal for mothers to feel fatigued during the postpartum period. Although the current literature is inconclusive as to when the peak period of fatigue occurs, the findings from this study suggest that first-time mothers can expect to experience fatigue for at least the first three weeks after childbirth with a significant decline in fatigue evident during the seventh postpartum week. Furthermore, factors that may contribute to fatigue include disrupted

sleep and overall lack of sleep, the constant demands associated with the continuous care required by a newborn in addition to household responsibilities, the fussing and crying behavior of infants, frequent demand feedings, especially at night, uncertainty about the infant's care, health concerns, too many visitors, and the adjustment to motherhood, generally. Coping strategies found to be effective that were conveyed by the first-time mothers in this study were numerous and practical. They incorporated the following recommendations: Making an effort to sleep when the baby sleeps or having a trusted person care for baby so the mother can sleep soundly and not feel the need to be alert for the infant awakening; obtaining help with the infant's care, as well as, with the cooking, housework and shopping; one mother found a supplemental bottle at night for her breastfed infant was useful; relaxation techniques such as hot baths, massage, music and visualization; taking a break from caring for the baby; exercise, initially in the form of walking; changing priorities to focus on care of the infant and the mother's well-being; limiting visitors if necessary; and seeking support from the husband or someone else who understands the mother's sit. ation.

While the present research was not an evaluation of interventions, information from the study regarding the preventable factors which were associated with postpartum fatigue can also be provided to new parents. Of notable significance was the relationship found between supplemental bottle feedings and increased levels of maternal fatigue or energy depletion. Clearly, in the promotion of health for the mother and newborn, nurses must encourage the practice of breastfeeding. Discouraging the use of supplemental feedings in the early postnatal period will not only be of value in relation to the concern of maternal fatigue levels but also in the prevention of unnecessary energy being directed towards providing two different types of feeding to the infant and dealing with potential feeding problems such as nipple confusion (Auerbach, 1990; Newman, 1992). Through accurate information and support, nurses pr vide valuable assistance to mothers in establishing breastfeeding. In addition, during hospitalization 44.9% of mothers who had episiotomies

claimed that discomfort from the site interfered with their ability to sleep. Although there was not a significant relationship between episiotomy discomfort and fatigue levels, pain management practices for some mothers need further examination.

In the assessment of maternal fatigue, the VAS-F has potential for practice when working with families. The VAS-F has been found to be a valid and reliable instrument that has simple instructions and takes minimal time for the participants to complete and for nurses to score. Therefore, if concerns were identified about a mother's fatigue level, the VAS-F could be used by nurses to quantitatively evaluate maternal fatigue. Further research is needed, however, to establish normative data for the postpartum population. The identification of outliers from the normative data would be of clinical relevance. A mother with high levels of fatigue needs to be further assessed for what is contributing to the fatigue and, specifically, for postnatal depression. Although it is acknowledged that not all mothers with high fatigue levels will develop a postnatal depression, those mothers experiencing a postnatal depression will likely be fatigued. Cox (1986) has developed a short screening tool for postpartum depression that could easily be utilized in practice. It is the mothers with extreme fatigue levels, then, that nurses need to be especially cognizant of in practice for those families may require referrals to appropriate agencies or linkage with additional services and support in the home.

Contribution of the Study

Fatigue has been identified in the research literature as a major concern for many mothers during the postpartum period. Despite the frequency of this problem, there has been very little in-depth study of maternal fatigue. The present research will assist health care professionals in understanding the nature and pattern of fatigue in first-time mothers during the postpartum period. This will enable nurses in hospital and community settings, who aim to promote the health and well-being of new families, to effectively educate and counsel first-time mothers on postpartum fatigue. In addition, a tool to measure fatigue,

the VAS-F, has been tested within a postpartum population over time thereby giving additional data on the suitability of its use for research and practice. Further study could be conducted to examine the relationship of selected psycho-social and/or obstetrical variables associated with maternal fatigue, as well as, the effectiveness of nursing strategies to help relieve postpartum fatigue.

In conclusion, fatigue is a complex, multidimensional concept. Interestingly, there is a recurrence of the theme in nursing literature for practice, education and research yet very little is known about fatigue. It is a concept that has generally not been well-understood nor well-defined. There has been a strong need in nursing for descriptive research in this area. The present study will contribute to the understanding of maternal fatigue and thus add to the body of knowledge on the phenomenon.

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APPENDIX A

Instrument Information

Further information about the VAS-F (Copyright 1990) can be obtained from:

Dr. Kathryn Lee
University of California, San Francisco
School of Nursing
Department of Family Health Care Nursing
N-411Y
San Francisco, California 04143-0606

Additional information about the POMS (Copyright 1971) is available from:

M. D. Angus and Associates Ltd.
2639 Kingsway Avenue
Port Coquitlam, B. C.
V3C 1T5

APPENDIX B

Sample Letter to Potential Subjects

Dear New Mother:

I am a nurse taking my Master in Nursing Degree at the University of Alberta. I am interested in studying the feelings that first-time mothers have in the eight weeks after the birth of a baby. Since little is known about the area, I feel that this is important research.

First-time mothers who agree to be in the study will be asked to complete 3 sets of questionnaires. This will occur while in hospital, during the 3rd, and 7th weeks after the baby is born. The first set will be done in hospital. The other two will be mailed to the mothers. Return postage to the researcher will be provided. It will take about 10 minutes to finish each set. There are no right or wrong answers to the questions. Participants may refuse to answer any questions.

I will need to list the participant's name, address, phone number and birthdate of the baby so I will know where and when to mail the questionnaires. This list will be destroyed when the study is completed. There may be some brief phone contact to remind mothers that the questionnaires are being mailed out, or to ask mothers if they wish to continue in the study. Information from the questionnaires will be reported for the group and not individually, so your responses will not be identified as coming from you. Mothers will be identified by a code number only.

You are under no obligation to volunteer for this study. If you refuse, there will be no changes to your nursing or medical care.

If you are interested in participating in this study, please let your nurse know. Also, you may phone me at 492-6251. I will then meet with you and answer any questions about the study.

Thank you.

Sincerely,

Brenda Hantos
Master in Nursing Student

APPENDIX C

Consent Form

Study: Fatigue Patterns of Mothers During the First Eight Weeks Postpartum

Researcher: Brenda Hantos
Master in Nursing Student
Faculty of Nursing
University of Alberta
Phone: 492-6251

Supervisor: Dr. P. A. Field
Professor, Faculty of Nursing
University of Alberta
Edmonton, Alberta T6G 2G3
Phone: 492-6248

The purpose of this study is to increase nurses' understanding of the feelings that first-time mothers have in the eight weeks following childbirth.

As a participant in this study, I understand that:

1. I will be asked to complete 3 sets of questionnaires. This will occur while in hospital, at 3 and 7 weeks after my baby is born. The first set will be done in hospital. The other two will be mailed to me. It will take about 10 minutes to complete each set. There are no right or wrong answers. Return postage and envelopes will be provided by the researcher.

2. The information from the questionnaires will be given for the group and not individually so my responses will not be identified as coming from me. A code number will be used to identify each questionnaire.

3. I may be phoned about the next set of questionnaires or to check if I plan to continue in the study.

4. The list with my name, address, phone number, birthdate of my baby and code number will be destroyed when the study is done.

5. Once the study is finished, the questionnaires will be placed in a locked file. They may be used for future research, but ethical approval would be required at that time. The questionnaires will not be destroyed.

6. I may withdraw from the study at any time. This will have no effect on my nursing or medical care. I may refuse to answer any part of the questionnaires.

7. There are no risks or benefits to me by taking part in this study but it may help new mothers in the future.

8. If I have any questions or concerns about the study, I may contact the researcher or the supervisor. A summary of the report is available to me upon request. A form will be attached to the last set of questionnaires.

I have been given the opportunity to ask questions about the study. They have been answered to my satisfaction.

I _____ have read the above and agree to participate in the study "Fatigue Patterns of Mothers During the First Eight Weeks Postpartum."

_____ _____
(Signature of Participant) (Date)

_____ _____
(Signature of Researcher) (Date)

APPENDIX D

Consent Form To Receive Information

Dear Study Participant:

Another researcher is planning to study fatigue, or tiredness, that women may have during the first year after childbirth. Mothers who agree to be in this study would be contacted when their baby is three, six and then twelve months old.

If you are interested in receiving information about being in this study, please sign the consent below. Return it with your last set of questionnaires. If you are not interested, do not sign the consent.

I _____ consent to receive information about another study on fatigue during the first year after childbirth. This information will be sent to me when my baby is about two to three months old. Even if I agree to receive this information, I do not have to be in the study. Before participating in this study, I will have to sign another consent form. There will be no change to my nursing or medical care if I do not volunteer for the study.

_____ _____

(Signature) (Date)

APPENDIX E

Biographical Data Form I Code Number____

Mother's Information

1. Age_____

2. Marital Status: __Married
   __Living with boyfriend
   __Single
   __Divorced or separated

3. Education Level Completed (Please circle)

Grade School	High School	College	University	Postgraduate
1 2 3 4 5 6 7 8 9	10 11 12	1 2 3 4	1 2 3 4	1 2 3 4

4. Occupation_____

5. Present Employment Status: __On maternity leave
   __Part-time
   __Full-time
   __Unemployed

.6. If on maternity leave: How long in the pregnancy did you work?_____

When do you plan to return to work?_____

7. Will you have any household help when you go home with the baby?

__No

__Yes Please specify who & if applicable, for how long _____

_____

8. Which of the following is closest to your yearly family income?

1. Less than $9,999___
2. $10,000 - $19,999___
3. $20,000 - $29,999___
4. $30,000 - $39,999___
5. $40,000 - $49,999___
6. $50,000 and over ___

Birth and Postnatal Information

1. Baby's Birthdate_____ Time of Birth_____
2. Sex_____
3. Was your baby: Premature? __No __Yes If so, how many weeks?_____
   Overdue? __No __Yes If so, how long?_____
4. Birth weight_____
5. Length of labour and delivery_____
6. Episiotomy: __No
   __Yes Does any discomfort keep you from sleeping?_____
7. Rooming-in: __24 Hour __Daytime Only
8. Feeding: __Breastfeeding __Bottlefeeding __Both
9. Did you or the baby have any health problems:
   __During the labour or delivery
   __While in hospital
   If so, please explain_____
   _____
   _____
10. Compared to what you expected, does your baby fuss and cry: __Less often
    __More often
    __About the same
    __Undecided
11. Anticipated date of discharge from hospital_____
12. Comments:

13. Today's date:_____
14. Present time is:_____

APPENDIX F

Biographical Data Form II and III Code Number____

1. Feeding: __Breastfeeding __Bottlefeeding __Both

2. Is your baby on any solid food? __No __Yes If so, what_____

3. How many times are you usually up with the baby at night?

   __0 __1 __2 __3 __4 or more

4. Was your sleep disrupted more than usual last night? __No
   __Yes
   __Undecided

5. Can you leave the baby with someone so that you can take a break (not including work)?

   __No
   __Yes Please specify who & how often_____

6. Does someone help you around the household?

   __No
   __Yes Please specify who_____

7. Does someone help you with the baby's care?

   __No
   __Yes Please specify who_____

8. Present employment status: __On maternity leave
   __Part-time
   __Full-time
   __Unemployed

9. If working, when did you return?_____

10. Compared to most babies of the same age, do you think that your baby fusses and cries:

___Less often __More often __About the same __Undecided

11. In the past 24 hours, did your baby fuss and cry more than usual? __No

__Yes

12. Have you or the baby had any health problems in the past 3 weeks?

__No

__Yes If so, please explain_____

_____

13. Have you ever been treated for a depression? __No

__Yes If so, when_____

14. Some mothers say that fatigue is a concern after having a baby. Do you agree?

__No

__Yes

__Undecided

15. If so, what has **most directly** contributed to your fatigue during the past week?

_____

_____

_____

16. What has been **useful** to help relieve your fatigue during the past week?

_____

_____

_____

17. Comments:

18. Today's date:_____

19. Present time is:_____

APPENDIX G

Summary Tables from Biographical Data Analyses

Table 26: Pearson Correlations of Fatigue and Energy Scores Over Time with Age

Fatigue Scores	r	p	Energy Scores	r	p
VASF H	0.02	.879	VASE H	-0.01	.932
VASF 3	0.01	.934	VASE 3	-0.08	.522
VASF 7	0.05	.717	VASE 7	-0.01	.958
Fatigue H	-0.13	.291	Vigor H	0.13	.278
Fatigue 3	-0.04	.773	Vigor 3	0.08	.504
Fatigue 7	-0.08	.528	Vigor 7	0.05	.709

Table 27: Oneway ANOVA Results: Fatigue and Energy Over Time by Marital Status

VASF H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	2159.62	3	719.87	2.18	0.099
Within Groups	20797.55	63	330.12		
Total	22957.17	66			

VASE H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1266.54	3	422.18	1.22	0.310
Within Groups	23205.27	67	346.35		
Total	24471.81	70			

Fatigue H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	118.80	3	39.60	0.83	0.480
Within Groups	3180.19	67	47.47		
Total	3298.99	70			

Vigor H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	113.49	3	37.83	1.03	0.383
Within Groups	2449.49	67	36.56		
Total	2562.99	70			

Table 27 Continued: Oneway ANOVA Results: Fatigue and Energy Over Time by Marital Status

VASF 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	523.38	3	174.46	0.47	0.706
Within Groups	23135.05	62	373.15		
Total	23658.43	65			

VASE 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	853.02	3	284.34	0.81	0.495
Within Groups	22231.90	63	352.89		
Total	23084.92	66			

Fatigue 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	81.17	3	27.06	0.68	0.566
Within Groups	2537.46	64	39.65		
Total	2618.63	67			

Vigor 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	281.18	3	93.73	2.57	0.062
Within Groups	2335.81	64	36.50		
Total	2616.99	67			

VASF 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1260.30	3	420.10	1.26	0.297
Within Groups	19348.63	58	333.60		
Total	20608.93	61			

VASE 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	253.70	3	84.57	0.22	0.880
Within Groups	21977.82	58	378.93		
Total	22231.51	61			

Table 27 Continued: Oneway ANOVA Results: Fatigue and Energy Over Time by Marital Status

Fatigue 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	143.71	3	47.90	1.54	0.213
Within Groups	1799.66	58	31.03		
Total	1943.37	61			

Vigor 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	55.24	3	18.41	0.40	0.756
Within Groups	2696.25	58	46.49		
Total	2751.48	61			

Table 28: Oneway ANOVA Results: Fatigue and Energy Over Time by Education Level

VASF H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1027.22	3	342.41	0.95	0.421
Within Groups	21921.89	61	359.38		
Total	22949.10	64			

VASE H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1898.43	4	474.61	1.35	0.261
Within Groups	22496.33	64	351.51		
Total	24394.76	68			

Fatigue H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	175.93	4	43.98	0.92	0.459
Within Groups	3064.71	64	47.89		
Total	3240.64	68			

Vigor H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	217.64	4	54.41	1.50	0.213
Within Groups	2325.23	64	36.33		
Total	2542.87	68			

Table 28 Continued: Oneway ANOVA Results: Fatigue and Energy Over Time by Education Level

VASF 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1240.06	4	310.01	0.83	0.515
Within Groups	22168.75	59	375.74		
Total	23408.81	63			

VASE 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	703.94	4	175.99	0.48	0.749
Within Groups	21927.79	60	365.46		
Total	22631.74	64			

Fatigue 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	103.03	4	25.76	0.66	0.623
Within Groups	2383.63	61	39.08		
Total	2486.67	65			

Vigor 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	89.39	4	22.35	0.56	0.696
Within Groups	2454.36	61	40.24		
Total	2543.76	65			

VASF 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1397.37	3	465.79	1.42	0.246
Within Groups	18339.45	56	327.49		
Total	19736.82	59			

VASE 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1001.01	3	333.67	0.90	0.449
Within Groups	20843.90	56	372.21		
Total	21844.92	59			

Table 28 Continued: Oneway ANOVA Results: Fatigue and Energy Over Time by Education Level

Fatigue 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	47.62	3	15.87	0.50	0.683
Within Groups	1774.32	56	31.68		
Total	1821.93	59			

Vigor 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	62.47	3	20.82	0.45	0.719
Within Groups	2599.26	56	46.42		
Total	2661.73	59			

Table 29: Oneway ANOVA Results: Fatigue and Energy During Hospitalization by Occupation

VASF H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	2697.32	8	337.16	0.94	0.493
Within Groups	17582.15	49	358.82		
Total	20279.46	57			

VASE H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1509.00	8	188.62	0.49	0.857
Within Groups	19582.17	51	383.96		
Total	21091.17	59			

Fatigue H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	306.60	8	38.33	0.82	0.589
Within Groups	2386.00	51	46.78		
Total	2692.60	59			

Vigor H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	172.62	8	21.58	0.55	0.810
Within Groups	1987.56	51	38.97		
Total	2160.18	59			

Table 30: Oneway ANOVA Results: Fatigue and Energy Over Time by Present Employment Status

VASF H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	609.27	3	203.09	0.57	0.635
Within Groups	22347.90	63	354.73		
Total	22957.17	66			

VASE H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	732.18	3	244.06	0.69	0.562
Within Groups	23739.63	67	354.32		
Total	24471.81	70			

Fatigue H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	188.25	3	62.75	1.35	0.265
Within Groups	3110.74	67	46.43		
Total	3298.99	70			

Vigor H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	155.60	3	51.87	1.44	0.238
Within Groups	2407.38	67	35.93		
Total	2562.99	70			

VASF 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	180.44	3	60.15	0.16	0.921
Within Groups	23679.80	64	370.00		
Total	23860.25	67			

VASE 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	460.45	3	153.48	0.426	0.736
Within Groups	23467.26	65	361.03		
Total	23927.71	68			

Table 30 Continued: Oneway ANOVA Results: Fatigue and Energy Over Time by Present Employment Status

Fatigue 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	8.01	3	2.67	0.07	0.977
Within Groups	2617.44	66	39.66		
Total	2625.44	69			

Vigor 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	125.57	3	41.86	1.10	0.357
Within Groups	2521.23	66	28.20		
Total	2646.80	69			

VASF 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1385.43	2	692.72	2.12	0.129
Within Groups	19595.42	60	326.59		
Total	20980.86	62			

VASE 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	224.69	2	112.35	0.31	0.738
Within Groups	22092.83	60	368.21		
Total	22317.52	62			

Fatigue 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	170.57	2	85.28	2.74	0.073
Within Groups	1866.51	60	31.11		
Total	2037.08	62			

Vigor 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	69.22	2	34.61	0.76	0.473
Within Groups	2737.86	60	45.63		
Total	2807.08	62			

Table 31: Pearson Correlations of Fatigue and Energy Scores During Hospitalization with Months Employed During Pregnancy

Fatigue Scores	r	p	Energy Scores	r	p
VASF H	0.24	.057	VASE H	-0.13	.270
Fatigue H	0.20	.108	Vigor H	-0.16	.197

Table 32: Pearson Correlations of Fatigue and Energy Scores at Three and Seven Weeks with Return to Work

Fatigue Scores	r	p	Energy Scores	r	p
VASF 3	0.07	.573	VASE 3	0.16	.183
VASF 7	0.22	.087	VASE 7	0.04	.778
Fatigue 3	0.04	.764	Vigor 3	0.17	.156
Fatigue 7	0.20	.115	Vigor 7	-0.17	.191

Table 33: Oneway ANOVA Results: Fatigue and Energy Over Time by Income

VASF H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	960.38	5	192.08	0.51	0.769
Within Groups	21555.38	57	378.16		
Total	22515.77	62			

VASE H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	2915.29	5	583.06	1.68	0.154
Within Groups	20882.20	60	348.04		
Total	23797.48	65			

Fatigue H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	81.39	5	16.28	0.33	0.893
Within Groups	2960.73	60	49.35		
Total	3042.12	65			

Table 33 Continued: Oneway ANOVA Results: Fatigue and Energy Over Time by Income

Vigor H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	96.65	5	19.33	0.50	0.774
Within Groups	2312.88	60	38.55		
Total	2409.53	65			

VASF 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1704.12	5	340.83	0.97	0.443
Within Groups	19630.15	56	350.54		
Total	21334.28	61			

VASE 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	845.81	5	169.16	0.45	0.809
Within Groups	21246.08	57	372.74		
Total	22091.90	62			

Fatigue 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	204.23	5	40.85	1.05	0.397
Within Groups	2215.04	57	38.86		
Total	2419.27	62			

Vigor 3

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	116.92	5	23.38	0.59	0.705
Within Groups	2244.73	57	39.38		
Total	2361.65	62			

VASF 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	842.56	5	168.51	0.46	0.802
Within Groups	18584.18	51	364.40		
Total	19426.73	56			

Table 33 Continued: Oneway ANOVA Results: Fatigue and Energy Over Time by Income

VASE 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	2063.69	5	412.74	1.15	0.346
Within Groups	18271.49	51	358.26		
Total	20335.18	56			

Fatigue 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	245.59	5	49.12	1.65	0.165
Within Groups	1520.73	51	29.82		
Total	1766.32	56			

Vigor 7

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	32.79	5	6.56	0.13	0.985
Within Groups	2579.14	51	50.57		
Total	2611.93	56			

Table 34: Pearson Correlations of Fatigue and Energy Scores During Hospitalization with Time of Birth

Fatigue Scores	r	p	Energy Scores	r	p
VASF H	-0.11	.378	VASE H	-0.11	.384
Fatigue H	-0.07	.558	Vigor H	0.13	.277

Table 35: Pearson Correlations of Fatigue and Energy Scores During Hospitalization with Birth Weight

Fatigue Scores	r	p	Energy Scores	r	p
VASF H	-0.01	.954	VASE H	-0.01	.912
Fatigue H	0.06	.617	Vigor H	0.03	.793

Table 36: Pearson Correlations of Fatigue and Energy Scores During Hospitalization with Length of Labour and Delivery

Fatigue Scores	r	p	Energy Scores	r	p
VASF H	0.22	.080	VASE H	-0.24	.053
Fatigue H	0.22	.068	Vigor H	-0.14	.246

Table 37: Pearson Correlations of Fatigue and Energy Scores During Hospitalization with Episiotomy

Fatigue Scores	r	p	Energy Scores	r	p
VASF H	0.10	.442	VASE H	-0.18	.134
Fatigue H	0.22	.071	Vigor H	-0.21	.087

Table 38: Oneway ANOVA Results: Fatigue and Energy During Hospitalization by Episiotomy Discomfort

VASF H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	625.27	1	625.27	1.75	0.192
Within Groups	16068.37	45	357.07		
Total	16693.64	46			

VASE H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	1266.47	1	1266.47	4.22	0.045*
Within Groups	13799.90	46	300.00		
Total	15066.37	47			

Fatigue H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	183.08	1	183.08	4.33	0.043*
Within Groups	1943.40	46	42.25		
Total	2126.48	47			

Table 38 Continued: Oneway ANOVA Results: Fatigue and Energy During Hospitalization by Episiotomy Discomfort

Vigor H

Source of Variation	SS	df	MS	F Ratio	p
Between Groups	111.54	1	111.54	3.76	0.059
Within Groups	1363.44	46	29.64		
Total	1474.98	47			

Results from the Scheffe post hoc analysis demonstrated that there was not a significant difference in fatigue and energy scores between those mothers who reported having episiotomy discomfort that interfered with their ability to sleep and those mothers who did not have this complaint.

Table 39: Pearson Correlations of Fatigue and Energy Scores at Seven Weeks with Introduction of Solids

Fatigue Scores	r	p	Energy Scores	r	p
VASF 7	0.03	.843	VASE 7	-0.02	.873
Fatigue 7	-0.12	.347	Vigor 7	0.18	.166

Table 40: Pearson Correlations of Fatigue and Energy Scores at Three and Seven Weeks with Break From Infant

Fatigue Scores	r	p	Energy Scores	r	p
VASF 3	0.12	.326	VASE 3	-0.16	.195
VASF 7	-0.18	.159	VASE 7	0.02	.884
Fatigue 3	0.09	.472	Vigor 3	<0.01	.987
Fatigue 7	<-0.01	.971	Vigor 7	0.02	.904

Table 41: Pearson Correlations of Fatigue and Energy Scores Over Time with Availability of Household Help

Fatigue Scores	r	p	Energy Scores	r	p
VASF H	<0.01	.988	VASE H	<-0.01	.992
VASF 3	0.02	.858	VASE 3	-0.03	.829
VASF 7	0.14	.284	VASE 7	0.14	.275
Fatigue H	-0.07	.551	Vigor H	-0.12	.321
Fatigue 3	0.03	.783	Vigor 3	0.09	.452
Fatigue 7	0.11	.376	Vigor 7	-0.07	.583

For the analysis, "no" was coded as "one" and "yes" was coded as "two".

Table 42: Pearson Correlations of Fatigue and Energy Scores at Three and Seven Weeks with Help With Infant's Care

Fatigue Scores	r	p	Energy Scores	r	p
VASF 3	-0.05	.707	VASE 3	0.12	.318
VASF 7	-0.08	.517	VASE 7	0.01	.959
Fatigue 3	-0.01	.914	Vigor 3	0.23	.055
Fatigue 7	-0.13	.300	Vigor 7	-0.11	.378

Table 43: Pearson Correlations of Fatigue and Energy Scores at Three and Seven Weeks with History of Depression

Fatigue Scores	r	p	Energy Scores	r	p
VASF 3	0.03	.780	VASE H	0.04	.761
VASF 7	<0.01	.980	VASE 7	-0.04	.731
Fatigue 3	-0.10	.397	Vigor 3	0.08	.504
Fatigue 7	0.02	.905	Vigor 7	-0.08	.554

Table 44: Pearson Correlations of Fatigue and Energy Scores During Hospitalization with Anticipated Postpartum Day of Discharge

Fatigue Scores	r	p	Energy Scores	r	p
VASF H	0.07	.600	VASE H	-0.20	.101
Fatigue H	0.04	.758	Vigor H	-0.02	.866

Table 45: Pearson Correlations of Fatigue and Energy Scores Over Time with Postpartum Day

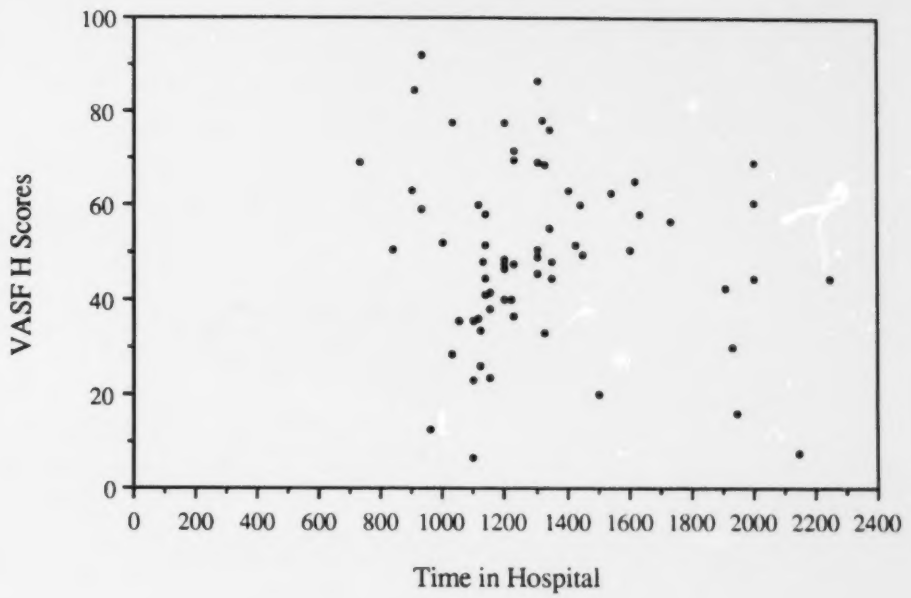
Fatigue Scores	r	p	Energy Scores	r	p
VASF H	0.03	.806	VASE H	-0.23	.055
VASF 3	0.09	.459	VASE 3	-0.12	.353
VASF 7	0.18	.154	VASE 7	-0.13	.321
Fatigue H	0.14	.239	Vigor H	-0.05	.702
Fatigue 3	-0.01	.966	Vigor 3	-0.14	.271
Fatigue 7	0.08	.533	Vigor 7	-0.12	.349

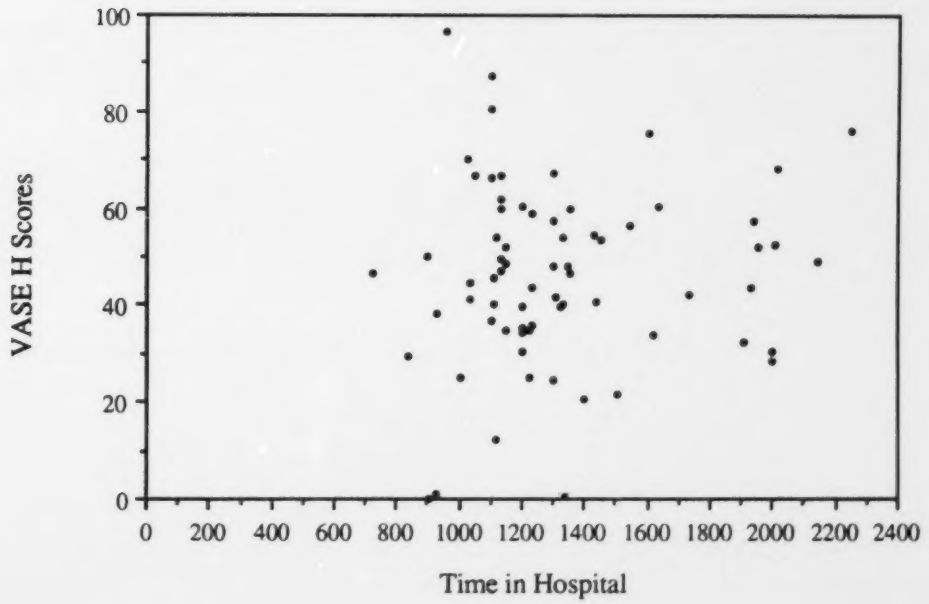
Table 46: Pearson Correlations of Fatigue and Energy Scores Over Time with Time of Instrument Completion

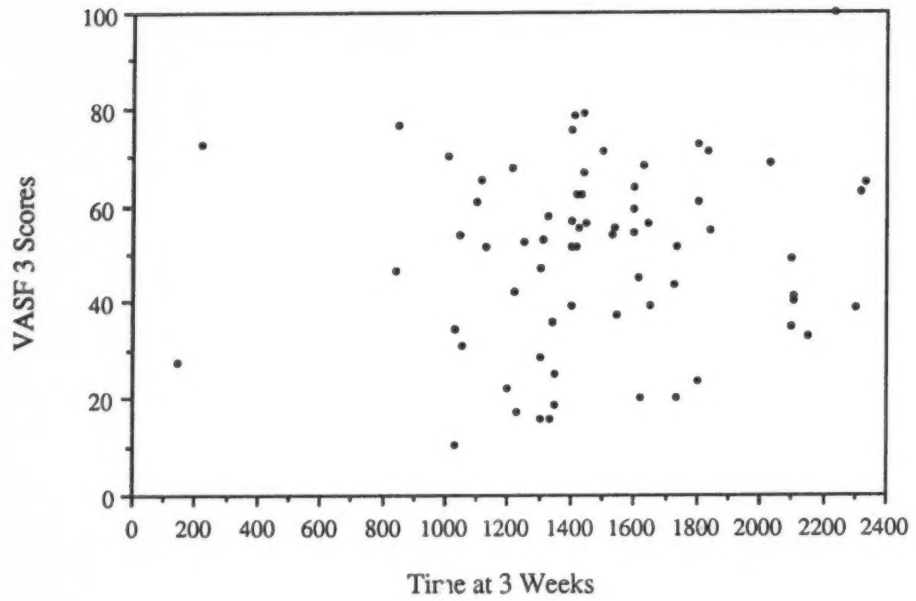
Fatigue Scores	r	p	Energy Scores	r	p
VASF H	-0.14	.272	VASE H	0.09	.453
VASF 3	0.11	.369	VASE 3	0.08	.528
VASF 7	0.17	.180	VASE 7	-0.02	.863
Fatigue H	-0.17	.162	Vigor H	0.12	.324
Fatigue 3	<0.01	.975	Vigor 3	0.05	.684
Fatigue 7	0.16	.210	Vigor 7	-0.03	.845

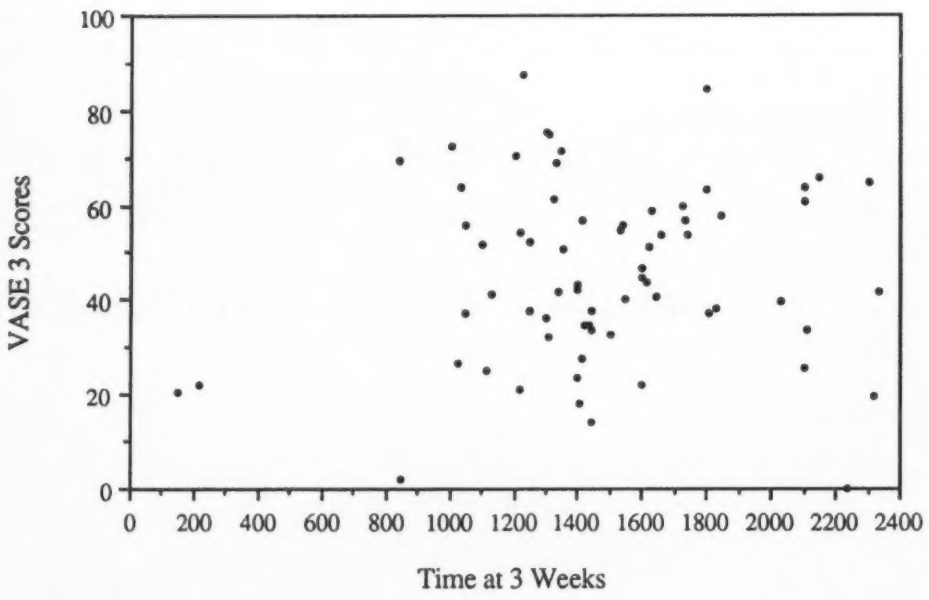
APPENDIX H

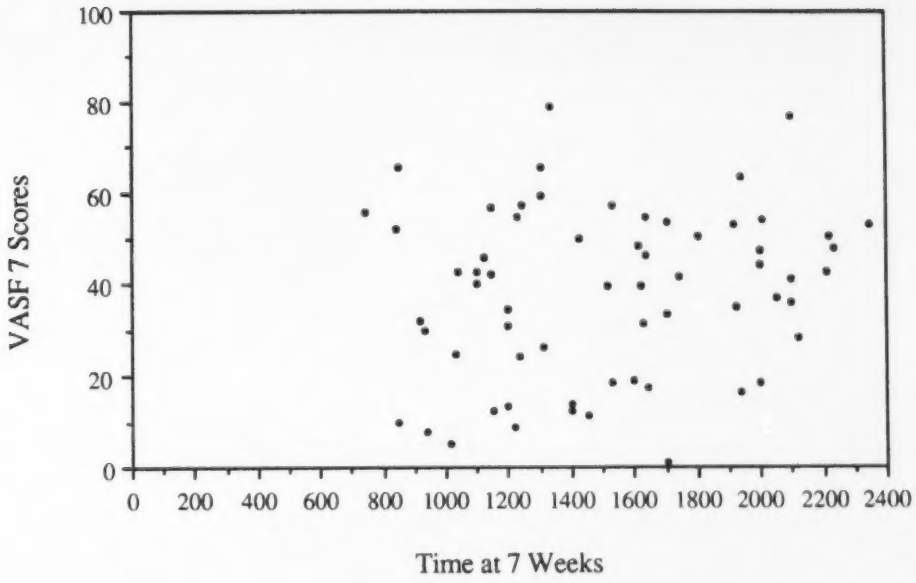
Scatterplots of VAS-F Scores and Time of Instrument Completion






VASF 3 Scores
100
80
60
40
20
0
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400
Time at 3 Weeks


VASE 3 Scores
100
80
60
40
20
0
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400
Time at 3 Weeks


VASF 7 Scores
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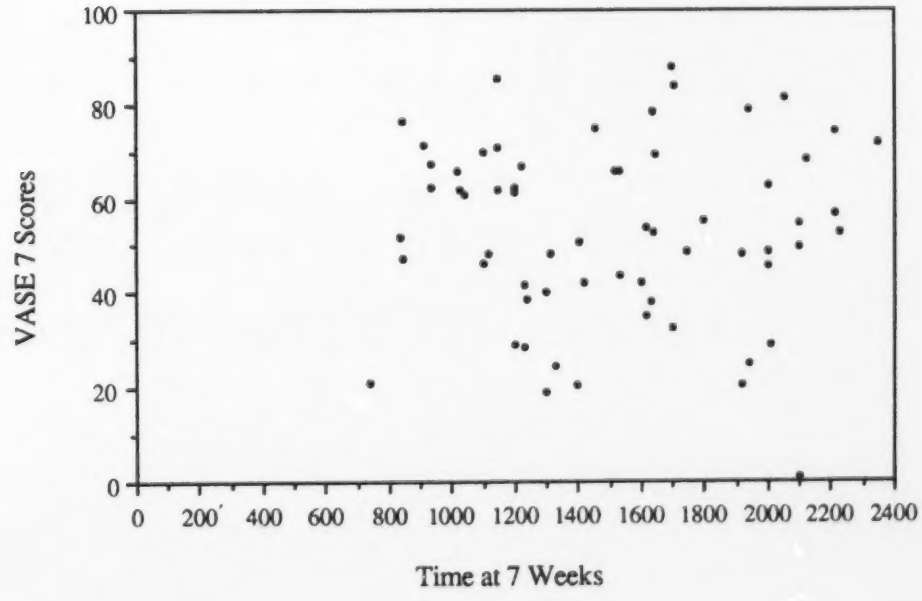
80
60
40
20
0
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400
Time at 7 Weeks


VASE 7 Scores
100
80
60
40
20
0
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400
Time at 7 Weeks

APPENDIX I

Factors Mothers Identified at Three and Seven Weeks which Contribute to Postpartum Fatigue

Responses	3 Weeks		7 Weeks	
	n	%	n	%
Disrupted Sleep	29	27.62	12	14.46
Lack of Sleep	27	25.71	21	25.30
Constant Demands	14	13.33	18	21.69
Feeding	8	7.62	5	6.02
Baby's Fussing or Crying	4	3.81	8	9.64
Lack of Routine	4	3.81	3	3.61
Uncertainty	4	3.81	0	0.00
Adjustment	3	2.86	1	1.21
Visitors	3	2.86	4	4.82
Health Concerns	2	1.90	6	7.23
Other	7	6.67	5	6.02
TOTAL	105	100.00	83	100.00